Astounding SCIENCE FICTION

AUGUST 1947

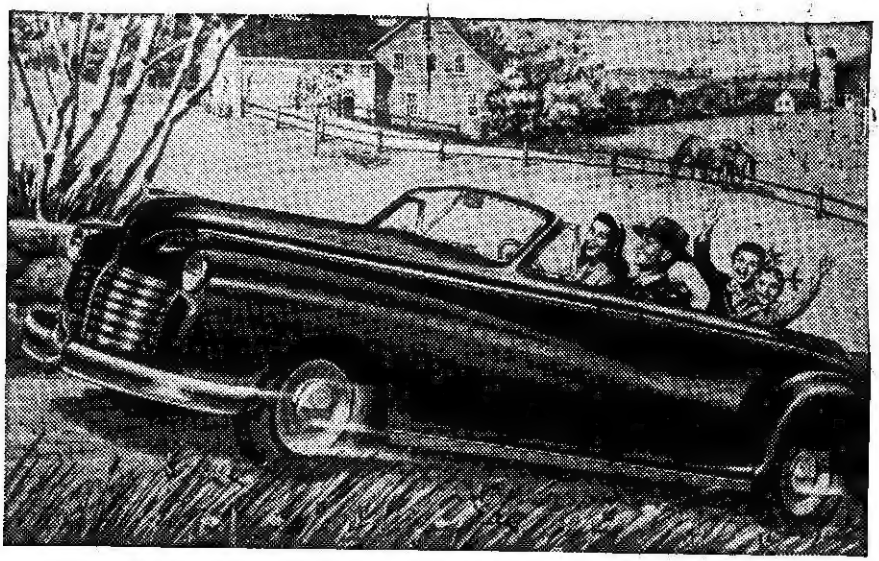
25 CENTS

BY L. RON HUBBARD

THE END IS NOT YET

Reg. U. S. Pat. Off.

STREET & SMITH'S ASTOUNDING SCIENCE-FICTION AUGUST 1947



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Astounding
SCIENCE FICTION

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CONTENTS

AUGUST, 1947 VOL. XXXIX, NO. 6

SERIAL

THE END IS NOT YET, *by L. Ron Hubbard* . . 6
(First of Three Parts)

NOVELETTES

INSOMNIA, INC., *by Harry Walton* 66
THE PERSON FROM PORLOCK, *by Raymond F. Jones* 96

SHORT STORIES

RAT RACE, *by George O. Smith* 55
PROPAGANDIST, *by Murray Leinster* 139

ARTICLES

BROAD BAND, *by J. J. Coupling* 116
CALENDAR FOR MARS, *by R. S. Richardson* . 133

READERS' DEPARTMENTS

THE EDITOR'S PAGE 4
THE ANALYTICAL LABORATORY . . . 95
IN TIMES TO COME 138
BRASS TACKS 157

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COVER BY ROGERS

Illustrations by Cartier, Davis, Rogers and Timmins

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$2.50 per Year in U. S. A. Printed in [redacted] the U. S. A. 25c per Copy

NEXT ISSUE ON SALE AUGUST 19, 1947

AST—1U

INDIFFERENCE—COSMIC SCALE

If ten couples landed and set up housekeeping on a newly opened, Earth-like planet for colonization, and there was no further immigration, the planet could have a population equal to Earth's present two billions within 400 years. And, judging from past performances, it would. It's characteristic of humanity that, on entering a new, wide-open, land-rich area, families are apt to be large. Ten and fifteen children per family were common only a few generations ago in the United States. With a whole planet to fill, it wouldn't take many generations to do the trick. It could well be that you'd be working with a geometric progression based on a factor of ten. Ten billions being 10^{10}, and allowing 30 years to a generation, that's only 300 years.

It wouldn't take man very long to populate a galaxy.

But it wouldn't be a galactic empire. Not if any present technique of government, or human education were relied on.

At the present time, very few people indeed have any real conception of the nature of this planet—of the way peoples in different parts of the world live. Even a global war, with armies marching and countermarching practically across the entire planet, wasn't enough to bring that about. Movies have come nearer doing it than any other medium—and they're a highly distorted means of communication. The pioneer carving out a new civilization on Deneb IX may have some idea of what life on Earth is like, but he'll be a dang sight too busy to worry about a virus disease that destroys all food plants on Tobart IV, 685,000 light-years across the galaxy in the other direction.

Or imagine a later time, and the problems of engineering societies. Assume that the galaxy can be crossed by interstellar ships in 15 days; and that communication beams, relayed from stellar system to stellar system, can cross in a matter of 15 minutes. That there are 10,000,000 inhabited, highly developed planets, and another 2,000,000 frontier-level planets. If there's an average population of 2,000,000,000 per planet, that gives us 20,000,000,000,000,000 people on the more highly developed planets alone.

Very few basic inventions are made; most of the success of engineering comes from the small developments that push equipment toward higher efficiency and simpler structure. The wartime development of printed electronic circuits bids fair to reduce radio sets from a jumble of many small, individual

parts to a few, mechanically simple parts. (Based, of course, on the invention of a whole new technology of printing metallic "inks" on ceramics.) One engineer per 100 population in a highly technical civilization would be a very low proportion; one communications equipment engineer per 1000 would be low indeed in so wide-spread, highly integrated a culture. But even if there were only 1 communications engineer in 10,000 there would be 2,000,000,000,000 members of the Galactic Society of Communications Engineers.

Obviously, there couldn't be *a* Journal, distributed to any such unwieldly organization. If one engineer in a billion wrote a technical paper for the Journal, there would be 2,000 papers a year to publish. The publication would be bulky. If only that one-in-a-billion paper presentation program were available, practically none of the important engineering papers would be available to engineers throughout the galaxy. If local or regional journals handle the technical papers, it will be practically impossible to keep things operating rationally. Equipment advances in the Alpha-Zed Sector, on one edge of the galaxy would proceed merrily, efficiently—but along entirely divergent lines from the progress being made independently (because of poor contact—by engineers in the Sigma-Zed sector at the other extreme of the galaxy.

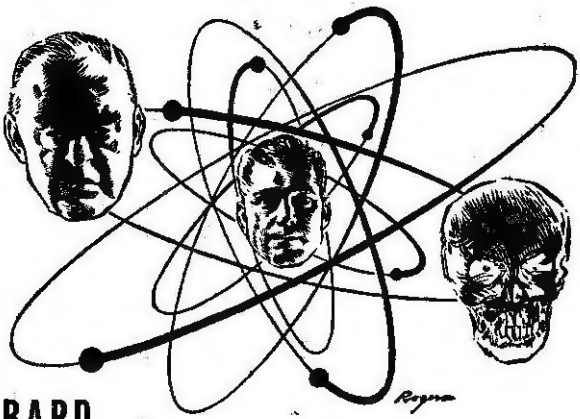
Once such divergence gets started, peculiar results tend to follow inexorably. Suppose that, after 20 years, both groups have made a 100% increase in effective range of equipment. Group A has done it by developing equipment capable of more driving power in less space and weight. Group S, on the other hand, has advanced on the line of a new theory of propagation. (For example, in radio, more brute-power on AM transmission overcomes static. FM, on the other hand, evades static by using a different modulation technique.) Each group has achieved equal pragmatic success —but the methods are divergent. Further progress will increase the divergence, and, once started in either direction, the investment in equipment will practically forbid conversion to the other type. Group A will, therefore, tend to ignore Group S's work as inapplicable to their situation. A feeling of indifference will grow up—

Lack of mutual understanding, because individual people simply can't remember *where* in the galaxy that planet Troy IX is, when there are, after all, 10,000,000 of those darned worlds to remember. Lack of mutual understanding because, naturally, no engineer can possibly keep up with everything being done by his two trillion fellow engineers.

It's too big for an individual to bother with—

THE EDITOR.

* * * * *



BY L. RON HUBBARD

THE END IS NOT YET

First of three parts of Hubbard's first post-war novel. A story of a few men against a dictatorship—and of the inevitable, the inescapable, result, whatever the determination, the high ideals and high courage of the rebels!

Illustrated by Rogers

INTRODUCTION

The street lay heavy with the grayish murk of fog, and no thicker or solid than this was the man who drifted to me that night, bearing a message and the tale that is told herein.

He was a square, triumphant man, with the solid, savage triumph of one who has but lately cheated death. His laugh was harsh, cynical, unpleasant to the ear; his speech was learned but careless from accustomed power; and the suit which bulged on his unstable bulk was tweed, gray as the fog, redolent as a laboratory.

I was writing at the time, hunched over the old secretary but favoring the fire—for cold bites an ancient wound and cold with fog is pain. That which I did was inconsequential now, pen scratches to outline dreams which would never be. I had been listening to the radio muttering as low as the sigh of flames in the grate. Russia had spoken her piece. France had felt her pride. And the United States and England blindly batted the specter of lost gain. Before spring, cold as the fog,

unreasoning as the fire, war would come again, for the third time in my generation. The knowledge was clammier than the fog. World War III would be the Atomic War.

He did not enter at the door—that was double-barred against the parades which eddied into Seventy-fifth Street from Broadway. Nothing had come in the slightly parted window but the gray tendrils and the blare of a far off band—a sad band, yelling against the mouth of waiting oblivion. He was occupying a chair which, not mine, drifted with half-seen metallic glints in the chimney corner. Through him, quite easily, I saw my Sessions seascape of a plunging, storm-labored ship.

The smoothness of his appearance, of his coming, did not jolt my nerves despite the fact that these have decreased in resiliency since the last war. It was so quiet, so effortless, that visitation, that I found myself calmly regarding the visitor as though I had for long expected him.

I knew him, I thought. It was Professor MacIlwraith of Columbia. Recollecting myself, I started up and bowed, mechanically fumbling for my cigarette case and staring covertly around for the wine decanter. I realize now that the dreadful portents of the moment had so bemused me, the internationally idiocy had so saddened me, that nothing could have jarred.

"You," he said in his harsh, unpleasant voice, "are Charles Martel."

It was an accusation but it was accurate identification.

"Wine?" I said.

"As you see me now, Captain Martel, I could not well imbibe wine, no matter the thirst." He picked up a square hand and looked ruefully through it. "We have perfected this far, no further—if you can call it perfection at all. My voice comes clear to you?"

"Of course," I said. "Cigarette?"

The firelight flicked on his craggy face as he packed a thoughtful pipe, searching how to begin something. He turned and said something over his shoulder to some one I did not see and nodded at the reply.

"You did not appear very disconcerted, sir," said MacIlwraith.

"Am I supposed to be? What the gods and science propose—"

He looked at me with approval. "Then interplane travel does not awe you. Perhaps you have studied it here on this plane?"

"Durak wrote a book. People plucked matter from holes in space. A few have seen through for a moment or two. A ghost is a scientific fact, I suppose. Have you come here to prove it?"

"Perhaps," and he seemed to study me.

"Then you've picked an ideal night, professor. The Atomic War awaits and we'll all be ghosts of a real sort before many dawns whisk by."

He laughed again, at some length, as though I had said something truly witty. His manner toward me seemed less harsh and, released for an instant from the intensity of his gaze, I realized for the first time that my Sessions seascape really was seeing straight through him.

"Come all the way in," I said.

His laughter grew and there seemed to be others laughing about him although I saw nothing. It was a pleased, flattering sort of mirth.

"If I came all the way through," said the professor, "so far as we know, I would have to stay on your plane. I should make clear the fact that I am not the Professor MacIlwraith you know. I am but his counterpart."

"How is this?"

"Why, when Washington was struck, the time plane split. Didn't you know?"

"Struck? By what?"

"The German Atomic Bomb, of course. That was in early 1945, a long time ago."

"Lead us not into dizzy by-trails, professor. Washington was not struck."

"Captain, that was the split of the time planes. Our Washington was struck. Yours was not. It catalyzed our advance in time so that we are many, many years ahead of you. We have had two atomic wars, so much time have we lived while you lived so little. The first was in 1945, the second was several years after. We have traveled almost two generations while you have gone but five or six years. We have made technological advances about which you have not yet begun to dream. Not only am I the Professor MacIlwraith you know, but I am thirty-seven years older, remarkably preserved by our medical science. But come, that seems to be war I hear on your radio. Don't tell me that you failed to win the war in 1945, even with your Washington spared!"

"We won the war," I said. "Our coats were not touched. We hit Japan with two atomic bombs and then the thing was done. No one who was anyone here was hurt. War was still play. A big football game. Something to make bets on. Something to sell bonds and slogans about. Something to laugh and grow rich about. Nobody was hurt, professor."

"Your scientists?" he asked.

"They did nothing. What could they do. Go along. Take their pay. Give away their patents. Make new formulas for slaughter. Don't be hard on them. They tried to break clean but they couldn't. Nobody who mattered was hurt."

"Didn't you have a United Nations? What did it do?"

I smiled a little. The band was fading out but someone was getting a cheer on the corner. Several cheers. And the fog was thicker and colder in the room.

"Professor, politics has been a thousand years behind every other means of human advancement. This will always be true. Politics depends upon changing the minds of a great many people. Science depends upon a few accurate discoveries learned by a few people. It has always been so. And thus science is turned back to murder on a par with the villianies of the middle ages. The United Nations?" I laughed at him.

"Captain, what, may I ask, have you yourself done?"

I poured a small glass of wine, glancing for his permission. I ex-

amined the amber glow of it against the warm firelight. "I spoke. I wrote. People said I was bitter. Said the war had turned my mind. Said I was wounded and to be pitied but, fortunately, not to be taken seriously. Some called me the Prophet of Doom. I even made the Sunday supplements once. The Prophet of Doom." I drank the wine. "But mostly they did not talk at all, or think at all. There were a few others like myself. We drowned casually in a sea of indifference."

"You took no action?"

"What action could I take? Oh, we had a few ideas, we did a few things. For a little while three atomic scientists and an ex-naval officer and myself attempted to form a group to be known as the Allied Scientists of the World. We attended a meeting or two at Cal Tech. We corresponded with the people at Alamogordo. But the scientists themselves were too savage, to extreme, and though we decided that the proper function of the scientist was to benefit all mankind even if scientists themselves had to rule the world, there was too much prima donna in the top flight, too much bitterness in the ranks. We wrote a charter, a code. We were destroyed by lack of capital in part, but mostly by the tremendous inertia of the people. We had ideas. No one could agree. And now—"

The televisor was flickering with a long-range view of the Russian dictator addressing a crowded mass in the Red Square. The volume was turned too low to hear the announcer. Probably it was a recast with motion pictures, for Russia was too well censored to permit a direct scan, especially just now.

I sat for a little while looking at the screen, feeling the drifting fog outside, hearing the far off thud of a drum—the only instrument of the departing band to carry the distance.

"Charles Martel," said the square, triumphant man, "you have nothing with which to reproach yourself. But you have not yet done all you could."

There was no accusation in it, rather an invitation.

"When nations are in trouble and people starve, they inevitably turn to a Messiah," he continued. "So turned the American Indian when he could not longer prevail against the white man. Thus faced the civilized world under the onslaught of barbarians two thousand years ago. So will turn mankind once more.

"You are not aware of it, but you had a counterpart in our plane, just as I have one in yours. He worked, thought, organized and worked again. From the wreathing smoke of our ruins he raised a civilization greater than any of the past. He gave his life in the endeavor, but there are happy millions who worship him here now."

"My counterpart there?"

"Yes, that portion of you which took this plane. A god he is, a hero beyond the maddest story of any Valhalla. I know not what you can do. My visit, which will be my last, concerns only the placing in your

hands of the story and notes of the Charles Martel we know, the Charles Martel that you can be. Are you still interested in severing your present interests and embarking upon a career which here you took?"

"Where are the works?"

"You will have them in a moment, for they are the sole purpose of my visit. But I must impress upon you the importance of these documents and urge that you read them as soon as possible. It appears" and he motioned toward the televisor, "that you have very little time."

"Give them to me."

"No, not yet. You wonder that we have here achieved interplane travel while you have not. You wonder why we have sources of energy not available to you. I shall not attempt to explain exactly what this is, for I have a handbook here which details it, a book written long ago by your counterpart here, a book entitled, 'Negative Energy Flows: A Neglected Field with Some Notes on Future Potentialities in Life Creation.' The details here may or may not be known on your plane. Just as energy which you use as electricity was once inducible only by amber and useful not at all, so is negative flow now produced in your plane only with glass. Can you imagine a culture without electricity? Then you can see how lost I would feel in a culture without electricity and negative flow—which we have called viticity from its association with life currents and waves. Many of your greatest puzzles there on your plane must come from an inability to measure, produce or utilize this magnificent and powerful source of energy and life. You are living in a world run on it and yet you cannot even measure it. You have yet to tap the greatest reservoir of energy and power which will be available to man.

"Your atomic energy and, hence, an atomic war, may be a fixation with you. You break up atoms and destroy things. But what holds the atom together? You are using a low-grade force now, and have in consequence a puzzled science and, without insulting you I hope, a low-grade culture."

"You come at a very late time," I said. "Tomorrow, next week, next month we will be deluged with self-navigating, circumnavigating missiles. We may not even know our enemy and will strike out blind, perhaps to destroy all. Yes, you come very late."

"Perhaps. Perhaps not. But I come to tell you that if you on this plane could produce viticity, you on that plane may certainly produce the thing for which you have all proper notes. But I may overestimate your backwardness. It may just be that somewhere there some one—not you—has already made viticity. In that event do not hope for a mild atomic war."

"A mild atomic war!" I gasped.

"Aye," said MacIlwraith. "I said 'mild'!"

"You mean viticity is that much more powerful than electricity?"

"And attracting atoms within themselves is that much more powe-

ful than fission. If it has been done on your plane, then do not sit and worry about atomic bombs. You'll not have just an atomic war. We had that this side, you know. Washington was struck and some other places in the world and we seem to have survived it—thanks to Charles Martel and the rest. But the war which devastated was not part of World War II. It was . . . but here are the books."

"Could I ask—?"

"Read the books," said MacIlwraith. "The story of Martel is written by his friend and is a biography meant to please. The others are volumes which changed our lives."

I did not realize that he had already begun to fade from my room, that only fog drifted where his chair had been.

Before the fire, in the center of the hearth rug, a volume began to appear, held in a spotlight of green which had no visible source. Another book grew and took body and then a third. The light faded and only the guttering fire splashed on the covers.

I took them and found them wholly solid. They were bound in scarlet and each was emblazoned with a great golden sword. The smaller pair were entitled: "Negative Energy Flows: A Neglected Field with Some Notes on Future Potentialities in Life Creation" and "Codes, Constitution and General Organization of the Allied Scientists of the World, with notes on Viticity Defense." After an interested examination I laid them by.

All my interest, for such is the ego of man, was focused upon "Charles Martel: A Biography by Le Chat a Faime."

And here is the story:

CHARLES MARTEL

A BIOGRAPHY

By

Le Chat a Faime

PROLOGUE

The prison darkness was sickening hot and the Negro in the next cell was moaning. Against the gray stone ceiling above the bunk of Charles Martel, Convict 168-353, marched or writhed the broken dreams of yesteryear.

For two heartbreaking years he had watched that dim parade each night, when the lights blacked out and thrust away the grating steel and stone and for two endless sweating summers he had endured the heat. Two winters had frozen him here. Two autumns. Two springs had brought no hope.

For life.

Treason against the United States of America.

Attempting to overthrow the government by force.

Aid and comfort to her enemies.

For life.

He who held the only key to all the senseless whirl without these walls was buried alive within them.

For life. But would he live when

the millions had died whom he had sought to save?

And across the ceiling marched the hell in his heart while the Negro moaned and far off on the prairie summer lightning flashed. And down from the unseen ceiling the great blob of a face muttered, "I'll get you, Charles Martel. I'll get you if I have to beat all hell for evidence. I'll get you, Charles Martel!"

For life.

"You awake, Martel?"

He lay for a little while not answering. Jimmy knew he was awake. Jimmy was a yegg that could see in the dark.

"Want a cigarette, Martel?"

He took Jimmy's cigarette and in the flash of the lighter saw the thin, scared visage of the man. Jimmy's hand was trembling. He didn't like the dark, this frightened little man. He wanted to see a human face for a moment and see a cigarette glow and fade as human breath drew on it.

The parade was stale bones and rags, thin with being watched. But it would march and march as the years went on until it came to its end, an end which stopped with a cheap black box in the dirt of the prison yard.

He watched the little yegg nervously twitch the cigarette between his lips. A year ago Jimmy had talked his whole life out. There was little to say which had not been said before. Charles Martel talked to no one.

"I got a feeling," said the yegg.

Martel shut off the parade with effort.

"I heard the radio in the shop saying something about Russia and England and Spain. I ain't smart like you, Martel. But I got a feeling." He paused, raised himself suddenly. "I got a feeling it ain't all right tonight."

"Go to sleep, Jimmy. It will be light in a few hours."

"No, this is different. My girl, I know she's gone. She ain't faithful, not like your boy. I got the cough and I'll never leave this place alive. I know that. But this is different."

"Go to sleep, Jimmy."

"No, listen, Martel. You're smart. You know about these things. You know about nations and wars and such. You're probably the smartest man in this place."

"Not smart enough to keep out of here," said Martel bitterly.

"It's the breaks. I make a clean job of it. I get the stuff in a bag and the bag out of the window. I hit a cop by accident. It's the breaks."

"Go to sleep, Jimmy."

"No, look. You see that last flash? That didn't look like lightning. It was yellow and green. It wasn't lightning."

Martel leaped from his bunk and clung savagely to the bars, staring at the sky. He recollected himself in a moment and turned back to drop wearily upon his blanket.

"I'm sorry, Martel. But I couldn't help saying—"

"That's all right, Jimmy. I didn't see the flash."

"But look, Martel, what color would it be if . . . if that was an atomic bomb? Green, wouldn't it? You know all about these things, Martel."

The little yegg was scared, not with a fear he could rationalize, not with any knowledge he had, but with the instinct of an animal who feels a breath of death.

A time elapsed and then, suddenly, Jimmy spoke sharply. "There! Look!"

The Negro had stopped moaning. The flash glowed upon the interior of the cell. Soon afterwards there came a shock through the earth and then a faint concussion in the air.

For a space the ugly stone pile seemed to have stopped living. Martel felt his heart hammering in his throat but he lay quietly on his bunk. He knew he was trapped. He knew that his boy was out there somewhere, unprotected. He was schooled in destruction and he knew how the ground must look under the spreading mushroom. But he lay still. The walls of the prison wretched and swayed. Something fell.

"Atom bomb? That was not an atom bomb. That was something a thousand times worse. What have I done?"

His voice was low. It could not have carried even to Jimmy. And yet it was as though he had announced the thing through the great speakers in the halls. As a car crashes against concrete the prison broke into frenzied, maddening sound.

Through the crazy din of screams, shaken bars and bawling men,

Jimmy cried, "Martel! Martel! Get me out of here! Get me out! We'll be fried! FRIED!"

"Shut up!" said Martel. "It was not that close. They can be seen for three hundred miles."

"No look. Martel, that wasn't no three hundred. That was ten, five. Why don't they open these doors?" And his fists began to beat against the lock and his voice joined a thousand more all screaming for the guards.

A siren began to yell and then rose to an aching incessant howl which drowned all else. A guard appeared at the end of the tier. He was newly awakened and his eyes were wild with fear. The lights were not yet on but there was scarlet and green light in the air. A searchlight swept into the tier. The lights flashed, flickered and went out.

There was yelling in the yard and bedlam in the walls. A car started up with a crash of gears and then slammed into something.

The guard looked irresolutely at the cell switches which would key open the doors. He looked at the forest of arms which reached at him. He was beaten back by the screams and turned to sprint away.

Martel went to the window and looked down into the yard. The main gate was open and three cars were starting through it, burdened with men in uniform. The searchlight swung in crazy arcs and beat, beat, beat at the tiny figures which followed the cars—all in uniform. A guard on the high wall threw away his gun and ran down the steps to disappear out of the gate.

The green and scarlet light struck against low clouds and rebounded again to earth. Summer lightning fluttered weakly on the horizon.

No one else left by that gate. The siren still screamed and the convicts yelled. But there was a deserted air about the place already as though death had set in.

"The dirty devils left us to starve!" shrieked the Negro. "Come back! Come back you—"

A change had come over Martel. The gray of the prison cloth was still upon his body but there was no defeat in his eyes. Jimmy turned from the door and whatever he was about to cry stuck in his throat.

By the light of a newspaper somebody had lighted for a torch, Martel seemed to have grown taller, stronger. There was a savage curve on his mouth which might have been a grin. There was bitterness and ferocity in his eyes. He seemed to be a man who could walk through steel and stone.

With an effort he tempered his expression. He stifled a laugh which beat for freedom in his throat.

For life?

He fought the laugh and sat down on the bunk. But there was a force in him, a brutal vitality which flowed like lightning from him. And Jimmy stood back to bars in awe.

Martel carefully modulated his voice, speaking just loud enough to be heard above the terror in that abandoned place.

"Give me your playing cards, Jimmy."

"You all right, Martel?"

"Give me your playing cards and a razor. And make those fools throw more packs up to this cell."

"But what—"

"Do as I command."

"Yes sir," said Jimmy. "What are we going to do?"

"Scrape cards and shred cellophane off your cigarettes. Gunpowder, Jimmy. I'm going to blow our way out of here."

The siren howled like a mad dog set loose upon the world.

FRANCE.

The dismal autumn rain soaked dirt from the cobbles of the broken courtyard. Along one wall ran a line of ragged pockmarks, plaster plucked with a leaden thumb, plaster which bore another substance in it here and there.

A lone, trench-coated man sadly gazed upon the scene, hands thrust deeply into his pockets, chin dropped on breast. He looked at a small, sodden bird which sat hopelessly on the remains of a tree, still like the man before the gloom of the place. Dawn was a lifeless thing which grayed the lowering clouds; it cast no shadow in a place where all was shadow. Beyond the wall, half-seen in mist, stood the jagged stones which had once raised a cross to God, but now a shattered hulk gazing somberly down on the rubble which had been France. The only crosses here were the seven posts which stood before the wall, posts which had been trees but were converted now so that they stood the height of a head. The performance of their office had chewed and carved their trunks the height of a breast. The bird sat brooding and the only courtyard song was the dismal gurgle of a spout which vomited leaden rain.

Charles Martel, if one can see correctly through the legends, the tales, the hero-worship, the blazing glory which later obscured all his past, must have been about thirty-five years of age. Through six long and arduous years he had served ceaselessly in the causes he believed to be right, and though some authorities trace his service to Spain at an earlier date, nineteen thirty-nine would seem to be his first European connection, for the reputation he must have possessed at that date as a scientist could not have been preceded by actual participation in war.

He had been employed in various capacities because of his basic skill as a nuclear physicist, but for the entire duration these employments had all been in the fields of espionage and intelligence under the Allies. Such activities are never blatant and all records of him were buried in the most secret files of Washington and London where they were later, of course, utterly destroyed. A large portion of any credit accruing from the interruption of the rocket missile and atomic research activities in the Axis powers which were Germany, Italy and Japan, was owing to him. Unseen, unknown, he had worked thoroughly and well.

But six long years of danger, arduous travel and combat leave deep marks on a man. And Charles Martel at this date was ill, nearly broken in body, exhausted and feverish in mind. Gone long ago were the naive dreams of glory in battle. Far behind him he had buried hypotheses and theories. The caldron of violence had boiled him down to the actualities, the hard values, to a clear and unshakable estimate of existence. He had killed. He had lived in rags and starved. He had learned the value of sleep in a white-sheeted bed and a cup of hot coffee. And he knew men, men and their governments. He knew these things and yet they were not yet wisdom for so swiftly had avalanched upon him the battering experiences of his immediate past that he had no respite in which to digest and really know.

He was tired and his heart was sick. There was pain in his body from the rain, the pain of old wounds and the far sharper miseries of mind which come from seeing too much too quickly and too long.

Another might have died or gone mad. Charles Martel was too strong even now, fractions of inches away from breaking though he might be. For there was a hard core in him that was himself, a core he had not known to exist in his university and his laboratory days. Men saw it without knowing what they saw and respected him.

Few knew him, not even his intimates in work, for the tasks of intelligence are hard and impress a secrecy into the depths of a man. There was a felt ruthlessness about him, a savage relentlessness, a power of being about him which commanded and received respect. And yet, as with all great hearts, there was a gentleness, too, born out of understanding and suffering which could go out to the helpless with as much strength as his savagery could strike the men who opposed him. He was too complex as an individual to be understood or labeled in a breath, which is the thing which probably brings down to us the many conflicting descriptions of him which gamut from sadist to saint. He was neither. He was a man whose nerve alone bore him up under the great burden of six long years of war.

Somberly he watched the bird which did not sing. They both were waiting and the rain came down.

*

A sort of shudder took him when he heard the files. The even thump of rhythmic boots, the clink of metal, the sodden slap of leather as the troop drew up, stopped, grounded arms and took the command at ease.

He looked at them then and found that they were French. But their faces went unseen below their dull helmets and such was the strange effect of rain that they appeared to be on the other side of some curtain and were not real at all but something badly dreamed and half remembered. The officer alone was human, nervously pacing up and down before the ranks, flicking at his boots with a crop, young and

inexperienced and very ill at ease. His pistol was holstered outside his raincoat and he touched its butt from time to time, quickly withdrawing from its black coldness. It was easy to see his mind. He had not been in the war; he had not killed his man. Today he would have to give the *coup de grâce* to eight. He had a little mustache of which he was probably proud but the blackness of it was startling against the pallor of his face. With worried and half-fearful eyes he gazed upon the leaden day.

The bird tenaciously kept his post before all this military preparation, clinging hard to one of the converted trees against a sudden gust of wind. The cathedral bell tower retained two eyes of air and stone and these looked sadly upon the courtyard. The mist thickened and the shattered bulk swam for a moment and then vanished. The officer glanced nervously at his watch and then ran to the gate to look down the road.

The lorry came with ponderous lurches, waddling through thick pools, slamming its canvas covers out and back, windshield swipes swinging like sluggish metronomes. It lurched through the gate and cast a final splash far from it before it halted in the yard. Two guards swung out of the cab and hurried to the rear where they undid the fastenings and permitted two more guards to step down.

With peremptory gestures the four called the burden out and when it did not come swiftly enough, two mounted up and yanked at the first man.

A French sergeant alighted from the cab now. In his grubby fist he carried a board on which paper was clipped, a board not unlike that carried by a grocery truck driver. He consulted it and counted the names on it with his pencil, then he counted the names backwards. Satisfied, he looked harshly at the eight men who had now been beaten into a ragged line behind the truck. He counted them with his pencil, counted them backwards and then did some arithmetic on his pad. He grunted with satisfaction and without saluting, thrust the receipt before the officer.

Taking the pencil, the nervous *teniente* counted the names, looked up and counted the prisoners. He was about to sign when he recalled something and with a frown looked at the paper.

"Siegfried Kline!"

One of the men in the line who stood sagging, hands tied behind him like the rest, replied, *"Hier."*

"Gustav Schwartz!"

"Hier."

And then rapidly, hardly waiting for the answer: "Josef Meinster, Ludwig Krantz, Stepan Draus, Franz Scharfenstein, Karl von Steel, Leutnant-Kommandant Gerber."

The line sagged back into hopelessness. The *tentiente* scribbled his signature on the slip and gave the board to the sergeant. A squad of men under a corporal detached itself from the ranks and came forward to thrust and hustle the

prisoners toward the posts. The sergeant looked after them, a twisted grin on his mouth. He spat and laughed shortly. The guards got back into the lorry and the sergeant took the wheel, backing the vehicle into the street and then lurching into some kind of gear-clashing motion, went away.

The officer gave directions as to the order of the men and the posts and had a sergeant pass out the black hoods and the ropes. He stood for a little, watching the prisoners being trussed, and then nervously exploded at his sergeant. There were eight prisoners but only seven posts. He argued with his second about it, waving the paper in the air, gesturing wildly with his crop.

"What shall I do? What shall I do? Oh, to be served by imbeciles, cabbages, camels!" He stabbed at the eighth prisoner as though he thrust into a sack of grain. "What shall I do with this one?"

The bird had withdrawn to the wall where it waited soddenly. The lowering mists swirled and the gutter gushed under a fresh torrent. Dirt gritted underfoot.

"A moment, my lieutenant," said Charles Martel. "There is some error here. Karl von Steel is not scheduled for execution."

The French officer swung about as though the quiet voice had goaded him beyond endurance. "And who might you be?"

"I am Charles Martel, my lieutenant. Intelligence advisor to the Allied War Crimes Commission which ordered this execution."

"Ah! *Capitaine* Martel!" The officer looked at the list and then thrust it under Martel's nose. "Read. There on the seventh line. Does that not say Karl von Steel? And look, does this paper not read that these men are to be shot? Does it not? *Voila!*" And he turned his back to give more furious directions to his sergeant.

The noncom did not appear impressed. He chewed at a heavy peasant mustache until the tirade was worn down a little and then interjected that while sergeants were generally responsible for many things and while lieutenants, even if they were young, must have their respect, the solution, if one wished to find one, was quite simple. One merely had to let one man wait until seven were dead and then kill the eighth. And why all this formality. It was cold and the men were wet.

"Lieutenant," said Martel, less courteously. "I must ask you to stop this execution until the commission member and the staff are informed."

"Ah! And now the execution must stop. You hear what my sergeant has said. My men, my poor children are wet and it is cold. Besides the commission has stated that it will be here. *Voila!*"

Martel looked at the prisoners. They were being mauled about and masked like so many bayonet dummies. There was a time when human beings were given choice of a blindfold, a cigarette, a chance for a last word. Civilization, in its

stately progress, was falling back on a front or two.

Martel was raking his weary mind for the name of Karl von Steel and the crime. Had he been less tired, less numb, the result which now took place would have come much earlier. Anger paled his lips.

The aged man who, even in this sordid scene, retained some dignity and seemed not afraid was Karl von Steel. They had knocked his glasses off in fixing a hood to fit him and then, as the extra man, had thrust him aside to wait his turn while the others were yanked without ceremony to the posts and lashed.

With a hand which shook, Martel whirled the officer about. "There is a mistake here, my nervous little man. Dr. Karl von Steel is a famous Austrian psychiatrist, the foremost scientist in his field. He was never intended for execution. I brought him myself for a trial witness. You will please to place him inside and out of the wet."

Cowed for an instant by tone and eyes, the Frenchman suddenly shook free. The anger was contagious and he flew into a tirade. His authority was being questioned. Did the paper not say—

"Silence!" said Martel.

The officer stopped in mid-rise.

"You will deliver this prisoner into my hands," said Martel. "Two months ago I gave him my word he was needed only as a witness."

Sullenly demanding authority and being damned for asking, the officer suddenly snatched the old prisoner by the arm and hurled him at Martel.

"But he does not leave this yard until the commission gives me orders!" fumed the lieutenant. "And if the commission does not come—"

But the commission was arriving, or at least a few of its members. There were several press photographers and reporters in a car behind the sleek limousine which came first. A little bundle of allied flag on the limousine's radiator cap and a large gold insignia on the door gave the vehicle identity and as much pomp as it could manage in this rain.

Martel drew the old man back out of the big car's road. Dr. von Steel's gray hair, matted with the rain, got into his eyes and he thrust it back.

"Thank you, captain," said von Steel. "This is a gallant gesture, but I fear it is of no avail. I was tried in secret and condemned."

"This is another matter, doctor," said Martel. "You had my word that you were only needed as a witness. There has been some error here, I think."

The old man's lips curved in a proud but cynical smile. "I appreciate your interest, captain. 'Word' is something which the world has forgotten, I think. But then, you have—" he paused. He had been looking interestedly at Martel's face, into his eyes. "Forgive me, captain. I think your word means something to you." There was respect in his voice.

Martel nodded briefly. His anger

had not diminished and there was a flush on his cheeks. He bent down to look into the limousine the windows of which were steamed and streaming. The suddenly opened rear door almost struck him.

Out of the car, as he supposed some Roman general might have stepped, came Mr. Connover Banks, political advisor and head without title—the chairman notwithstanding even if named—of the Allied War Crimes Commission.

He was a small man, Mr. Connover Banks, but he swelled into something like stature each time before he spoke. He was flabby soft so that one could imagine picking pieces off him with finger and thumb. There was a hearty joviality about him in public but his black, small eyes were hidden well within the folds of his round, unhealthy face. He was picking bits of breakfast out of his front teeth and sucking them noisily from his little fingers.

"Martel! Well, well, well. My old friend Martel. Ready and on the job, I see. Sent a car around for you earlier. Get there? Fine, fine, fine. Well, I see we have our little friends all rounded up and ready for the trimming, ha, ha. Some friends of yours, here?"

"This man is Karl von Steel," said Martel. "There is an order here for him to be shot this morning."

"So?" said Connover Banks. "Well, there are so many, one hardly remembers them all. But if he's to be shot—"

"He won't be," said Martel.

"What? How's this?" And some of the oil went off his tongue and the words had the hint of a file on brass about them.

"Mr. Banks," said Martel, "this man is a doctor of the University of Vienna. He is an Austrian, not a German. He happens to be the world's foremost psychiatrist-diagnostician. He is a research scientist. His books are standard texts in every university in America."

"So?" drawled Mr. Banks. He stepped aside to let others out of the car and these went over to look at the prisoners. Among them was a French general, Chibault. Mr. Banks looked after them and showed an inclination to leave.

"But that is not the point," continued Martel. "Whether he is famous or not, he is a scientist. And he is a man. His life is not to be lightly taken. I gave him my word when I brought him here that he was wanted just as a witness. You yourself so informed me."

Mr. Banks looked diffidently at the prisoner. "He is a dangerous man. Every Nazi concentration camp had complete pamphlets of his works. One of his texts on frustration was used as a standard torture by the SS guards. Now."

"Mr. Banks, the doctor was a prisoner in Chateau Colaine from nineteen forty-one until six months ago. All his works were written before the war."

"Besides," said Mr. Banks, "the man is a socialist, probably a communist."

"I am not prepared to argue that," said Martel. "But—"

It was Dr. von Steel who interposed and said in good English, "Young man, you are incurring displeasure for my sake. I assure you it is useless. They have tried and convicted me—"

"I beg your pardon, Dr. von Steel," said Martel, "but there is something else here. Mr. Banks, I gave this man my word he was needed only as a witness. He could have escaped."

Mr. Banks smiled jovially. "Why, don't disturb yourself about that, Martel. The Nazis, like this man, broke their word all the time." He grinned through the torrent which ran from his hat brim.

"The difficulty," said Martel, "in fighting a war is to keep from sinking to the level of one's enemies. I gave my word, Mr. Banks, and I want that word kept!"

With a sly glance around him as though to be sure they were alone, Mr. Banks drew Martel slightly to one side and whispered, "This is pretty much out of our hands, old boy. The French had evidence we didn't count on. They took this one right out from under us. It's the French, you see, and that absolves us. Marshal Germaine—"

"Marshal Germaine is here in this town," said Martel. "I can reach him."

"By all means, by all means. There's a phone right inside there, Martel. Go see what you can do. Use my name, if you like."

Mr. Banks walked quickly away toward the group of officials. The preparations were well advanced now. The firing squad was filing up into position under the nervous orders of the lieutenant whose anxiety was increased by the presence of a general of his army.

Martel turned to Dr. von Steel and would have spoken but the doctor was holding out an envelope. "If you fail, captain, there's something you could do."

"I won't fail," said Martel, starting off.

"Wait, captain. There is always a chance, I know. But I have a feeling—Well, here." He twitched his bound hands about until they indicated his left jacket pocket. "There's a letter in there. I doubt these gentlemen would deliver it."

Impatient to be off, Martel took the letter from the pocket and hid it quickly to keep it dry.

"To my daughter," said von Steel. "I am not sure where she is. They have permitted no communication with anyone. Would you deliver it?"

"Certainly. But there'll be no need."

Martel ran across the yard into the broken building. It was a precinct station but there were no gendarmes about at this hour. He unhooked the phone and called the Grand Hotel.

There was considerable delay. The lines were few. The operator rang for some time before the hotel finally answered. The clerk was very sleepy and would not for a while admit that Marshal Germaine was there. After much coaxing and

fuming by turns, Martel managed to get him to send the porter to bring the marshal to the phone.

He managed to light a soggy cigarette with reluctant matches and puffed nervously on it without satisfaction. The wait seemed endless. He tried to peer out into the yard but could not without deserting the phone.

The line was buzzing peculiarly and with a flash of suspicion he hung up and called the operator back. No, he was not connected to the hotel. Yes, she would ring again but the lines were not many and perhaps the hotel had reasons for not talking to him— She rang. The sleepy clerk was antagonistic now. Yes, he had sent a porter. A liar? Of course he was no liar! Yes, he had sent a porter. For whom? Well—All right, all right, the gentleman need not be violent. Marshal Germaine. Very well, he would send for Marshal Germaine. But it was a very bad hour—Martel waited.

There was a ragged crash of rifles, deafening even here inside. It was succeeded by three more crashes in rapid order.

Inanely Martel wondered if the bird had flown away.

There was one single report—a revolver. It was reported six more times.

"Marshal Germaine speaking. Who? Oh yes, Captain Martel. Yes, yes, captain. How are you? . . . Dr. Karl von Steel? I can't seem to remember . . . Oh, yes. The scientist. Ah, too bad, too bad . . . Why, of course, captain. If you think there's any reasonable doubt. I'll send an order over immediately for a stay. Certainly."

"Thank you, marshal. It's a matter—"

"I quite understand, Martel. And I can't forget what you did for us after Dieppe. Glad to oblige."

Martel felt a tingle of cold upon him as he put down the phone. He thrust back and started toward the door.

There was the crash of a single volley.

Martel grasped the porch post with a crushing grip. The yard seemed to spin before him as though the rain which sliced down was composed of dancers which whirled and whirled and whirled. The line of men was filing off. He looked with the fascination of horror at what the French lieutenant was doing.

There was a single pistol report.

Martel turned and looked vacantly into the precinct station. It seemed to him as though laughter was rolling through the empty bareness of the place. Oily laughter which came now from the desk, now from the phone, now from the windows. The whole place was tipping crazily as though he were aboard an unsteady boat in a raging sea. His ears roared and his throat was too dry to swallow. Things seemed to be brushing against him, dancing around him, laughing.

With a hard wrench at himself he steadied his nerves and wits. He discovered he was talking to himself and clamped his jaw tight.

He turned and walked out into the yard.

One body of the first seven had been cut from its post. The others slumped, drenched with rain which darkened as it poured over their breasts. All trees were occupied.

The yard now had a drab pickup truck in it and the men of this were pushing the first body about on the post to cut it loose.

The lieutenant was white. He was trying to reload his pistol but after a little gave it up and thrust it into his holster. He went and sat down on a stone, recollected himself and leaped up to saunter with extreme and careful casualness back of the files which the sergeant was forming up.

A noncom from the pickup truck ran up to the officer and thrust a pencil and sheet at him. The officer signed and, folding the receipt, surrendered his own. The noncom carefully counted the names twice and then with the pencil counted the lifeless sacks his men were hauling about. He nodded and signed his name again. The springs of the pickup groaned. Small trails of darkness went between truck and posts.

The little bird stood soddenly on the wall and the rain came down.

Martel looked across to where Mr. Banks and the other officials had finished having their pictures taken. He waited by the limousine, oblivious of water, coldness, bodies and pooled blood.

Mr. Banks would have gone to the other side of the limousine but Martel shifted over.

Before either could speak, General Chibault cheerfully slapped Mr. Banks on the shoulder. "Well, leave it to you Americans. You'll teach us all a thing or two. Efficiency. Efficiency in bombing. Efficiency in rounding them up. And now efficiency in this. Speed, accuracy, timing. Amazing people. Now, take that last one, von Steel. I never would have thought a man like that would have been so closely connected with the torture camps if you hadn't told us, Banks. Efficiency, that does it. Speed, dash, accuracy. Well, let's all have another breakfast. At my place. Starved, aren't you?"

Martel barred their way. A motorcycle had drawn up.

"Mr. Banks, a stay in the execution of Dr. Karl von Steel was granted by Marshal Germaine." He was distracted by the messenger asking for Captain Martel and he took the envelope and ripped it open.

Looking at the paper which was thrust at him, Mr. Banks shrugged. "I am afraid I should have known this sooner, Martel."

"You knew I was phoning the marshal."

"Say, old man," said Banks. "You look pretty bad. Probably a touch of flu coming on. Here, get in out of the wet and—"

"You knew I was phoning," said Martel.

"Captain—"

"That is a courtesy title. I am a civilian, Mr. Banks. I am employed—"

"You are employed as an intelligence officer, Martel," said Banks with sudden viciousness. "You are employed to do as you are told and to follow your orders. I knew nothing about your phoning. This stay was procured without any authority and I myself shall have to explain and apologize for you to Marshal Germaine—"

"You'll have to explain some day to a Higher Power than that, Mr. Banks," said Martel. "Dr. von Steel was innocent. The Nazis used anything any scientist had done just as the United States used whatever the brains England and the United States had to offer. Dr. von Steel has saved the sanity of millions of people."

"His work tortured a hundred thousand to death!" snarled Banks. "Now take care what you do. This is insubordination—"

"One has to have a superior to be subordinate, Mr. Banks. You caused me to break my word. You have used me this time. You have probably used me a thousand times as shabbily."

"Turn over to me instantly your lists, Martel. You are fired."

Martel reached with fury-shaken fingers into his trench coat. He got out matches at the same time. He tried hard to get a light going and failed. With a grab, Banks sought to seize the liaison and underground lists. He forgot these were the property of Martel. He knew how vital they were in locating men in all this tumbled wreck of Europe.

Martel ripped them a dozen times and stamped them into a bloody pool under his feet.

"You're fired!" cried Banks, tearing the cigar out of his mouth and spitting its fragments. "You're fired!"

"Mr. Banks," said Martel, "you may be a powerful political figure, you may be rich. But politics and money won't take away the fact that you've murdered a man this morning, murdered him as surely as if you'd sunk a knife into his heart with your own hand. You're drunk on killing. You're a rotten sadist, a coward! When a state touches a single hair on the head of an innocent man, when it murders without cause, that state is doomed, doomed as surely as Karl von Steel. If you've got a shred of conscience about you, if you've got a heart or even a dirty whipped rag of decency left—"

"Arrest this man!" cried Banks. "He's gone mad!"

Martel struck him across the mouth, struck him and smashed the cigar and the bloated face. Banks slammed back into the pickup truck door and fell forward again. Martel stepped aside and let him drop into the red pools which had spread there.

Stunned and shaking, Banks got up. He had caught himself with his hands against the cobbles and now those hands dripped darkly. Martel would have struck again but he paused at the sight of the hands, paused long enough for General Chibault and an orderly to grab him and throw him to one side.

Banks stood shaking a fist. "I'll get you, Charles Martel. I'll get you if I have to beat all hell for evidence. I'll get you, Charles Martel!"

They got Banks into the limousine and the cars went away. The pick-up finished its business and left. The lieutenant, with recovered spirits, marched away at the head of his men. Their military boots gritted against the fouled cobbles, metal clinked, leather creaked. The rhythmic beat faded into the rain.

Martel stood alone in the courtyard, holding the stay in a nerveless hand. He shook himself a little and looked slowly around. Nothing looked the same to him. The rain, the vomiting gutter spout, the rearing, shattered tower of the church. these were different, too.

The little bird preened its sodden feathers, but not to sing. In small, wary hops it came down to the first post and began to pick hungrily at the newly shattered trunk.

Martel looked at the bird, the pave, the pockmarked wall. His eyes were glazed as though he had been struck in every wound anew. There was a chill of fever on him from the swamps of Italy and the bitter day was hot upon his skin. Before him the world dimmed and cleared and dimmed again and all things wrapped themselves in unfamiliar cloaks and madly swirled about him.

He stumbled to the gate and slowly, numbly gazed back.

The little bird was eating and the rain came down.

The day was hot and the dust rose in orange curtains from the abandoned fields of Southern France, to speed in swirls through hamlet and village and race, as though mocking the lack of other traffic, whirlwind against whirlwind down the long, curving roads. Where rumbling, Roman catapults had groaned along, where the pageantry of chivalry was iron oxide and calcium amongst the ruts, where barefoot kings had on penance walked, a lonely man, leaning heavily upon a stick, limped southward.

There was weariness, not of the body but of the mind and soul, in every stumbling step, and there was a dazed wildness in his eye as though he knew not where he went.

But he did know. Clutched in his hand was a small, square envelope, much grimed, which said:

Anne von Steel
Villa Verite
Biarritz, France.

Now and then he stuffed it in the pocket of his dusty jacket but before a hundred yards had gone he consulted it again. He must be almost there. For the difficulty of his travel made the way very long. He was puzzled from time to time by his lack of money. In the dullness which submerged him there seemed to be a fact he should know about the money, a fact which he could not grasp.

He had asked a gendarme about it and that one, being a very old man who had seen much of war and understanding, had discussed

the possibilities of his having been struck and robbed. But the only name on which they could fasten was "Banks" and this obviously must be wrong.

A cart had brought him far, a driver of a truck farther. A slim officer of the army had given him a lift in a rattling old car and had recognized him and, alarmed at his condition, required much persuasion before the journey could be resumed.

The days and faces in them were all jumbled. People looked at him strangely, tapped their skulls and shrugged. The war. In the end it wrecked the finest of them.

An old woman who fancied she saw in him a resemblance to her son, exported to Germany as a laborer and never seen again, stopped to feed him milk and bread from a precious basket. When she touched his hand she found it hot and, looking more closely at him, saw that he was ill with a fever which bordered on delirium and yet could not persuade him to stop at her cottage.

"I have a message. I promised a thing," he muttered and, getting stiffly up, walked on.

It was a nightmare walk where strange fancies changed the pleasant day and green fields into a peopled world of weird shapes and stranger conversations. He was quite sane toward it. He knew that he was ill. But he could afford no energy expended upon a momentary rest or, so it seemed, upon a righting of the things about him.

He was at the University of California sometimes or at Cal Tech, arguing theories with professors with the next few years to prove him right, but whenever he caught himself at this talking he ceased ashamedly.

Odd bits of knowledge came floating back to him. Entire sections of his thesis on chain reaction—a thesis which had been often consulted of late and with some awe, a fact which he, buried in war, did not know—came back to plague him with their endless propoundings of nearly unsolvable equations so that sometimes as he rested he made aimless summation marks with his stick in the dust only to see what he did and hastily dust them out.

It was thus that the urchin found him. The boy was about thirteen but his face looked ages older. His clothing was gunny sacking and his shoes were sections of a discarded tire. He had a dirty mop of blond hair and calculating blue eyes. Fed and washed he might have been a very presentable boy but as he was, a beggar, a bit of jetsam in war's backwash, not even a self-respecting peasant would have touched him.

"Francs!" he demanded, standing squarely before the man. "Bread!"

The man looked at him idly but made no move to rise or fish in his pocket and the boy became bolder.

"Give me francs!"

The child came into focus, perhaps the first face he had clearly seen in all this travel.

"I . . . I have no money."

The boy's skeleton hands clenched. "I am an English gentle-

man. I do not have anything to eat. Francs!"

Looking at him more closely, the man blinked. "I have no money," he said in English.

The boy looked interested. "You are English?"

"I am American."

"I am an English gentleman."

After a little the man asked, "What is your name?"

"They call me Pierre, these French. The Americans called me Bud. My name is neither Pierre nor Bud. I am a gentleman. My father told me to say that. He said I was and that I should say I was for it is true."

"Where is your father?"

The child shut his jaw tightly and his eyes were wet for an instant. "Where are you going?" he asked suddenly.

The man showed him the crumpled envelope. The boy evidently had small command of reading for his lips moved in the difficulty of spelling it out. When he looked back at the man his brow contracted with insight.

"You're sick," said the boy accusingly.

"I must go to Biarritz," said the man, repeating what was by now an ancient formula.

"You are a gentleman," said the boy. "I can tell. You are a gentleman. Therefore I must help you." He said it in English, with a decided accent which mirrored both German and French influences.

"Thank you," said the man quietly.

"You have taken the wrong road," said the boy. "You should have turned two kilometers back and you did not. But I shall show you across a field to the right road."

"Thank you," said the man. "I am going to Biarritz." He rose and leaned on the stick.

"Mon Dieu," said the boy. "You are very weak. *Lieber Gott,* you must be as hungry as I. Come, I shall steal a chicken at a place I know and take you to Biarritz. You would die otherwise. I do this because we are both gentlemen."

"Thank you," said the man.

Five days later, with the grime of travel thick upon them, they came to the Villa Verite and while the man sank upon the top step the urchin pounded hugely with the great knocker.

A long silence followed, punctured now and then by fresh hammerings by the boy, and at last a bolt grated and the door, still retained by a chain, swung open. A careful inspection by an unseen person ensued and then the chain, too, was unhooked.

The boy gaped and his boldness melted into confusion. The girl on whom he looked was beautiful. Suffering had deepened that beauty and her eyes were soft and kind. The boy had a vague memory of his mother—such a person as this he remembered her, though she was only twenty.

The boy finally recovered his speech.

"My friend and I, we have brought you a letter," he said. "He has walked across France to bring

it to you and with him I have traveled for five days. He has it in his hand."

The boy knelt to take it but the man gripped it tightly.

"It is all right," said the boy. "This is the place."

"What is her name?" muttered the man.

"What is your name?" said the boy.

"Anne. Anne von Steel."

As though realizing for the first time that he had arrived at his destination, the man thrust down with his stick and managed to stand again. He turned, looking at the letter to make sure it was all right and still there. He half extended it and then seemed to want confirmation from her. He looked at her face with feverish eyes.

He backed a step and finally tore his glance away. He looked about him as though to assure himself that he was not dead that he had come to confront an angel. Disbelieving he stared at her face.

She took the letter from him which he gave now with ease. Perhaps she would have spoken then, for her glance on him was curiously and oddly confused, but her eyes dropping saw the handwriting.

She had not known where her father had gone nor why. For three months there had been no word from him. Her cry was glad as she ripped the envelope but as she read she became paler and from her parted lips came a low moan.

The urchin looked at her with deepening concern and then, ashamed of his dirty hands but alarmed, he took her by the wrist and half supporting her led her into the house.

The man sat on the step for some time and then, finding the boy beside him once more asked, "Where is the letter?" And he ransacked his pockets.

"We delivered it," said the boy.

"Oh." And after a moment. "I saw a beautiful woman just now. Was that Anne von Steel?"

"Yes."

"Oh." He sat a while longer and then stood slowly. He looked out at the round, rolling surf and across the blue Mediterranean. Bewildered now that the purpose of weeks was gone, he was uncertain. It seemed as though his life had stopped there on the steps and that something was buried and forgotten and must never be dug out again.

A street cleaner on the ocean boulevard before the house stopped, stared and then hastily pulled his cap over his face and pushed his cart forward at a swift pace. The man took no notice of him.

Suddenly it seemed to the man that he had come home somehow. He looked at the front door which stood wide.

She filled his vision once more.

"I have been selfish," she said. "Please come—Why, you are ill!"

He smiled a little. "I don't feel very well."

"Help me," she said to the boy.

Together they aided the man into the house.

AFRICA, THE HIGH ATLAS.

The chamber was dark, dark un-

der the mystery of two thousand years. A temple once, built by unknown hands, supported by columns which were Grecian and yet not Grecian, it had housed many strange gods: Roman, Carthaginian, Vandal, Arab and Berber.

Oil pots sputtered under lighted wicks along the wall and threw poor light down upon the great marble table in the center of the room—a table which had grooves for sacrificial blood. On a throne above a mutilated, robbed and dishonored god showed the remains of a smile and an eye, gazing down upon the table where sat four men.

Outside, partly seen through a long tunnel, lay the jagged brown brutality of the Atlas Mountains and the coastal plain far beyond and far below. From here one might have seen Hannibal disembark or the smoke which had been Carthage. Partly in the view stood a Berber soldier, swathed round with dirty djellaba, a bandoleer glittering over his shoulder, a fine German rifle serving as an elbow rest and staff. Between the plain below and the soldier lay a landing field, hacked out by excited and confused soldiery and forgotten by more easily confused generals. Sheep nibbled now at the sparse grass and all traces of wheels had been carefully covered.

The four at the table had been silent for some time. This quietness they had in common, for there was much in each on which to brood. Their other bond was science.

Jaeckel, the great physicist was idly stirring the masses of papers before him, his great hands dwarfing the rest of him, an old man except for the nervous, high flame which burned in his brilliant eyes.

"I don't," he said at last, "see that we can do it. It is too risky a thing. While we are not hunted, we must not risk being so."

"Every day a plane goes out," said Dr. Thorpe. "It could do more than bring back books, reports and an occasional man. I say it must." He was a bony angular man of great vitality and a habit of stabbing with his finger as he talked. He stabbed it now at Murtowsky and Bethel. "We sit here and do nothing while we are faced with the most damnable plot the world has ever seen. We sit here and do nothing while the entire field of science is in very great danger of perishing. A war of such ferocity, that the last one will look tame, will break out in a matter of years. And yet we sit here and do nothing. All we need is a fiddle, gentlemen."

"Rome," said Murtowsky in a gloomy voice as dark as his beard, "is already dead. We can rescue and assemble and perhaps even hope when there is no hope." He turned his sad doleful glance on Bethel. "What chance have four or even four dozen against the world?"

"I suppose that goes for you, too," said Thorpe, also looking at Bethel.

The one they addressed coughed and looked at the shattered god. The thing always offended his Christian senses and he wrenched his weak blue eyes hastily away. He swallowed hard.

"Meekness will triumph in the

end," said Bethel. "The world will succeeed in blowing itself apart and if God wills—"

"God seems to have precious little to do with this," said the atheist Thorpe. "It looks more to me like devil's work."

Jaeckel smiled thinly, his famous colleagues, Thorpe, the Englishman who hated war as much as any warrior ever hated foe, and who was willing to be quite bloody about it; Murtowsky, the great Russian surgeon, supposedly dead in the purge in spite of all his great heart experiments; and Bethel the mild metallurgist of Norway—rarely failed to wrangle amongst themselves at this meeting every day.

Jaeckel was hard and factual. He had quit the Germans in 1943 when they had called upon him for atomic work. He had been unseen by the world ever since. His laboratory in an old mine nearby was waiting for him and he restrained an impulse to stalk out.

Coldly Jaeckel said, "If you gentlemen wish, we can go on playing dead for years and years. Personally I think it is a coward's rôle. We have positive evidence that a group headed by one man, Jules Fabrecken, is promoting a war between the United States and Russia. And we know definitely that that war will probably wipe out half of the population of each country. Furthermore, gentlemen, that group hunts down our brothers of science, arrests them, shoots them, or picks their brains, and hides them in dusty vaults where they cannot benefit humanity.

"I agree with Thorpe. We are here gathered to save science and I agree with him that we do very little about it."

Dr. Thorpe would have launched forth again but he looked at Jaeckel and subsided.

"Jules Fabrecken, through Connover Banks, caused the execution of von Steel," said Jaeckel, "for no other reason than that von Steel was working as a psychologist upon a new ideology. Hardly a day passes but what Professor Haus sends us information from Biarritz to the effect that another scientist has either been shot or has disappeared."

"The reason the Fabrecken crowd does this," said Thorpe, "is obvious. The best brains in the world today are scientists. A new weapon, a new invention, a new system of economics could very well completely upset the large and valuable interests of the Fabrecken crowd. They have seen what the atomic bomb could do. But now that they have made certain that Russia also has an atomic bomb and are trying their best to engage Russia in a war with the United States, the elimination of scientists who cannot be bought becomes paramount to them. The scientists must either be hired so that a finger can be kept on their inventions and research or they must kill them on some trumped-up charge.

"They are operating by their own lights," he continued. "It seems outrageous to them that any change should occur in the world to upset their way of life. And perhaps it is only blindness which permits them

to sit idly by while millions of human beings die as the result of their creeds. But whatever it is, it's vicious. The first and foremost reason why we assembled here was to try to prevent what they were doing."

"We are doing something," said Bethel peevishly. "We are bringing back books." And he pointed at the vaults under the temple. "And we are rescuing scientists whenever we can. You don't for a moment think we could actively block the Fabrecken crowd, much less aggressively oppose them, do you? What folly that would be!"

"It would be very difficult," said Murtowsky gloomily.

"Gentlemen, gentlemen," said Thorpe, "you make me ashamed of you. If Jules Fabrecken were to get wind of this hideaway, he would have no slightest compunctions in having us all shot. What are we? rabbits? that we sit here waiting. If we only had some bold spirit, a leader who could make things right. Who could protect the world of thought, invention and advancement against Fabrecken and his like. If we only had a leader. For, unless we take an aggressive stand all that we know and call culture is going to disappear."

"We can rescue our fellow scientists from trouble with our means," said Bethel, "and we can safeguard wisdom. That is all."

Dr. Thorpe, however, was not quite through. "Gentlemen, as an economist I can show you where to get more money. We have planes, pilots, barracks, dispersal bases and, with Haus, a fine intelligent corps. What weak spirits have we here if we, reputedly greatest in our lines, cannot thrust forth into this world and put a stop to madness which cannot do otherwise than cause a war so swift, so final, so completely devastating that every other war in history will seem as tame as a boy's cricket match. We are sadly in want of spirit!" He stood up in disgust.

"We pay the penalty of our anarchy," said Jaeckel. "But a moment, Dr. Thorpe. There was another matter in the Haus report. Your indulgence please."

"By all means," said Thorpe, sitting down with a glare at Murtowsky and Bethel.

"Haus reports to us that the Power has the name of Charles Martel high on its list and that it is only a matter of time."

"Charles Martel!" said the Russian, showing enthusiasm for the first time. "Ah, a brilliant mind. He aided my escape through the German lines and we had some famous talks. He spoke of something which he called the life current, the binding force just the opposite from electricity. He said it was far more powerful than electricity and yet we didn't even know enough to measure it. He said any fission is essentially tame compared to this *viticity* as he called it. Ah, a brilliant mind, gentlemen, a brilliant mind!"

"I have heard of him," said Bethel.

Thorpe alone looked puzzled and uneasy.

"Haus," continued Jaeckel, long suffering with interruptions, "states that Martel might be at Biarritz."

"Ah," said Thorpe. "But this is something which bears explaining. Haus and our intelligence headquarters is at Biarritz. Martel is at Biarritz. Martel left the field of science in nineteen thirty-nine and has developed nothing brilliant since. Why? Because he served as an intelligence officer, the Allies using his fine command of nuclear physics to detect operations in that field by the Axis. He served in other intelligence capacities until the end of the war and then was drafted to the Allied War Crimes Commission. Connover Banks, gentlemen," he added in a low, hard voice.

"Connover Banks?" said Murtowsky. "Linked with Martel? I do not believe it!"

"There is much to suspect here," said Bethel. "But it is difficult to think of the great Martel in such odd company."

"Odd company!" snorted Thorpe. "Fiendish, wicked, brutal, sadistic, greedy—"

"Gentlemen, gentlemen," said Jaeckel. "Haus only wonders if anyone amongst our people would know more about this. It is very shaky business indeed."

"I say don't take a chance," said Thorpe. "Kill him and keep Haus safe. Haus is important—"

"Well, well," said Jaeckel. "Somehow, Dr. Thorpe, I have a feeling that I have heard your sentiments somewhere before." And he held a mocking hand aloft in a Nazi salute. He smothered the papers again. "I took the liberty of asking before we met. Our young men know nothing but good of Martel—"

"He arrested and had von Steel shot!" said Thorpe.

The other three stared at him.

Jaeckel did not even have to glance around. "I suppose, gentlemen, that that settles everything. I shall microradio Haus tonight to be careful of him."

"Do," said Murtowsky, with a disappointed sigh. "And he was such a fine nuclear physicist. Such fine ideas. Too bad."

"We might tell Haus to . . . er—" and Bethel made a gun of his thumb and forefinger.

"He is a great scientist," said Jaeckel. "We have all done strange things in our days. We have helped make weapons that murdered millions, all of us, wittingly or not. We have no direct proof that he brought down von Steel. If he did—well, when the world goes down, if he is still alive, he can have his trial and a fair trial."

"After which we can shoot him," said Dr. Thorpe.

"After which," said Jaeckel, "we will be just."

"And shoot him," said the timid Bethel.

They folded up their papers and slowly filed out into the African sunlight and the old god with the shattered face sat quietly and smiled.

MEXICO.

His fine head thrown back, his large, intelligent eyes looking far

out across the plains of Mexico, Jules Fabrecken took his ease on the veranda of his hacienda and listened to the reports of Mr. Connover Banks. Now and then, like the sun flashing upon the silver conchas of one of his *vaqueros* in the fields before him, his greenish eyes would spark, sole sign of interest in his beautifully molded face.

Jules Fabrecken's aristocratic hands plucked idly at the heavy silk which covered the chair arms, now agitatedly over some detail of the report he did not like, now strokingly as though he touched a purring cat.

Throned there, Jules Fabrecken looked like majesty. In every curve and color of him one could see the power which he held. The vast realms he commanded, the mighty structures he had designed or seized, the millions of workmen throughout the world all seemed to be not scattered over the surface of the globe but concentrated here, filling the man with something beyond a common spirit. And yet there was something drugged about him, something sleeping, perhaps the conscience which he had long ago found to be an excessive burden.

A genius of finance, a master of industry, a wizard of complex politics, it was part of that power that he could restrain surface vanity to such a point that scarcely anyone beyond the strata of the economic and governmental lords of earth had heard of him. Obscurity was no stranger to him. Indeed few on earth had had more obscure beginnings. His family had been poorer than poverty itself and he had been hurled into the streets almost as soon as he could walk and there some defect in his character had implied to him that the world was an evil place and that the hands of all mankind were clenched threateningly before his face, ready, yea eager, to crush his teeth down his throat.

He had run errands for a seaport's lowest scum, he had feasted from garbage pails, he had cheated and sold out his comrades, he had crouched in misery starved for care, for sympathy, his very savageness in the face of travail making him unapproachable.

From the gutter he had watched the fine carriages go by, but unlike the usual fanatic he had not jeered, he had yearned. By menial services, amid belly-twisting privations, he had fought his way through school, supposing that once he had a fine education, all gates would open. And then he had learned that gates open only to the well born, the heirs to glory others had made, and from this rebuff he took again a lesson that everything was organized to cast him down.

Like most men who had suffered danger from the multitude as one of the multitude, Fabrecken had scant love for his brother man. His friends he conceived to be given him for his own use and he used them. Society had shut the gates against him. By picking locks he had opened them to begin one of the most fantastic careers of capitalism the world had ever seen.

He knew what was good for

Fabrecken. He made the mistake of thinking that it would be good for everyone. To him man was blind and needed an overlord. And it never occurred to him that the overlord they needed was not Jules Fabrecken.

Quietly, many years before, he had closed a life as a common attorney in the Scandinavian countries and had begun to build. Cautiously, certainly and infallibly, he had worked himself to the crest of Scandinavian industry, pulling into his own two hands the final controls of steel, coal, transport and communication. But this was not sufficient to his dreams, scarcely less than a beginning of his empire.

He had found an obscure Austrian corporal, a man mad with vanity and blinded with hatred and by the judicious issuance of funds and political directions, Fabrecken had brought about the absorption of all German industry by the German state and then the utter destruction of the German state itself and the death of the no longer obscure corporal with it.

And though this left one Fabrecken with virtual industrial monopolies in Europe, financed by the war expenditures of the late German state, it was not yet the end of his dreams.

And there he sat in Mexico, listening quietly, dreaming behind his eyes, balancing his ledgers. He had shaken free of the last stigma the war had attached to him, he was on the verge of ending his Mexican

exile. His vast holdings awaited him. Quietly he listened to his friend Connover Banks and quietly he planned.

Jules Fabrecken had the unfortunate conviction that the world needed to be saved.

Banks continued his report on his own activities. He appeared very much at ease, occasionally dragging on a cigar, punctuating his remarks with smoke-plumed gestures. All the falsity of his donned personality was here dropped, all his forced bon-hommie, all his subterfuge. For a long time now Banks had worked with Jules Fabrecken and in that Banks knew himself inferior in genius to Fabrecken, Banks could recognize the dream.

Finance, governing heads, atomic production and other incidentals disposed of, Banks turned now to the theme of his recent activities.

"You know that science outfit I told you about before, Jules. Well, I think I've got them pushed out of the picture. Practically nothing has been heard of from that quarter since I nailed von Steel."

Fabrecken sat up straight with great attention. "Aha! So you managed that!"

"Well, one might say it more or less managed itself."

"Good!" said Fabrecken heartily, slapping Banks on the knee. "You know, Connover, that is the one thing which can stand in front of us. The one thing! *Ach*, these idealists! All practical considerations fail to reach them. Why, the fools don't even fear for their own lives. Irrational!"

Fabrecken stood up and faced Banks. "That is the one thing which worries me. We have laid careful plans. We have loaned money to almost every government official we can use. The structure is almost completed and soon the world can look forward to a long, unbroken prosperity. But since the day you told me the scientists of Europe were determined to take a strong stand against good, sound conservative government such as we propose, I have worried."

"I can't see why," said Banks. "What can a few thousand crackpots do against guns and money?"

"Ah, but you still continue in this strange blindness," said Fabrecken. "Can't you see it, Connover? The plague of the earth is the idealist! He comes prancing out with a spacious philosophy, armed with pamphlets, braying wild speeches, screaming down all orderly conducts and experience and suddenly there is war!

"What caused the French revolution? Idealists! And it all but wrecked France. What caused every upheaval in the social orders of man? Idealists! They come storming into the picture. They have nothing and they hate anyone who is smart enough to own a shirt and suddenly there is war and slaughter, blood in the streets. And does this advance man? No!

"Connover, we are the only ones who can advance man. We employ men to perfect manufacturing processes, then we set up factories.

We stabilize a country's economy. We give men ways to earn and eat and work and be comfortable. And when we have standardized his living, when all is well, then the only thing we have to fear is some raving lunatic who can catch the attention of the idle and thoughtless and stampede them into useless, entirely uncalled-for action. The result is chaos."

"Well, these scientists," said Banks, "weren't really demanding that anybody fight anybody. They claimed that nationalism was the cause of wars and they said that now there was an atomic bomb man couldn't risk another war and there—"

"Just so! So they stop further wars, they wanted to create one. This is folly. They can't even think, those people. There are always the haves and the have-nots. The have-nots will eternally war to take away whatever is possessed by the haves. This is a natural order of things. Men are very far from equal. Why, look there. See that *vaquero*? Could he run this hacienda? No! And yet the stupid fool thinks he should own it. Mental agility must always be rewarded. And if we have the agility to monopolize the industrial world, then certainly we are entitled to the profits therefrom.

"Connover, we live in an anarchy of industry. Competition is a political catchword. Some people think it is necessary while anyone with intelligence knows that monopoly is the safest possible means of satisfying the needs of men. It can be proven by theoretical economics that monopoly is most likely to benefit the individual man.

"What we seek to do is create a monoply which will halt this useless waste of materials and energy. Once done, this will give the world peace and prosperity for hundreds of years. But I cannot impress upon you too strongly the danger which lurks in the garrets and alleys. Some wild fanatic may always be expected who, without any experience or hope of gain, will seek to overthrow an existing regime in the name of progress."

"Von Steel," said Banks, "is out of the way. But there may be others. We managed to catch up with almost all of his organization in Europe."

"Exactly. There may be others! Connover, if we wish to succeed, we must be vigilant. And in the name of future peace we must be merciless. Once we have established ourselves we must assure ourselves of lasting success. It is a primary right of every government to protect itself. New inventions, crackpot philosophers, unhinged labor-leaders, these alone can ruin us. And I promise you that if we are ruined, so is civilization. All we seek to do is perfect the existing economic and industrial pattern and then hold it so. The plan is simple even if the working is complex. Once Russia and the United States are out of the way, the field is clear. These alone, as existing governments, are strong enough to oppose.

"Man deserves his future peace,

Connover. And we can create it for him and then keep it. It will not be long before we can accomplish it."

"What happens," said Banks, "when my European work is over?"

"For the moment, continue your vigilance. Continue to act the fool, the vengeful representative of outraged powers. Wear your fine clothes and smoke big cigars. Be the typical industrialist turned patriotic. Meantime recruit one way or another the scientists we need and put aside those we don't—for not the least of an industrial monopoly, Connover, is a monopoly on potential creation—"

"I don't exactly like," said Banks, "the role of executioner. It gets my guts sometimes. Jules, I wasn't cut out to be—"

"Don't worry about it. Your American interests will be as nothing compared to the future structure. I can appreciate what you mean. But who else can we trust but ourselves? Keep up the rôle. Big cigars, big talk. And soon, when the situation looks right you will become attorney general of the United States. And the military there will become alarmed with Russia's preparations. And Russia will have its atomic bombs thanks to us. But then, you know the plan. As soon as we can we will push the button and our people everywhere will act. And after that, Connover, prosperity.

"We have to grit our teeth awhile at our tactics. The ends justify the means. Remember always that we are putting a final end to the anarchy of industry and with that the anarchy of nations. And all we have to fear is the wild-eyed fool with a two-penny idea who will stampede the unthinking world against *us*—the only ones who can possibly bring stability to the hell on earth men have been calling life."

RIVIERA.

The ebullient bursts of laughter which came from the beach did not seem sufficiently out of place, that brilliant summer day, to cause such close interest on the part of an old, shabby eccentric whose pursuit of street cleaning was entirely neglected. He clung to the stone wall above the bright yellow sand and nervously scratched the backs of his legs with his toes one at a time and wriggled continually down and out of sight whenever he thought he might be observed. His eyes hid behind centimeter thick spectacles and his twisted face lurked behind an enormous white mustache. He was perpetually on the verge of running and hiding but each time a gloomy fascination pinned him to the spot.

Before the clear, calm blue of the Mediterranean, Charles and Anne Martel, with an English waif called Buckingham, played with an enormous striped ball.

Buckingham was fourteen but very light for his age and so had been knocked solidly out of his corner of the triangle for three times running to land in a great spurt of yellow sand. Each time he lay and howled dismally like a dog and then, beginning a laugh which

seemed by its very force to propel him from the ground, bounded back to his post to take new punishment.

Just now, Anne having thrown him the ball, he suddenly reversed direction and pitched it back at her so solidly and so suddenly that the great soft blob of air and rubber quite launched her. Buckingham, on his part, was ready to bellow a triumphant cry but this had no more than started from his throat than it occurred to him that he might have injured her and before the sand had well settled around her he had flown to her side.

"Oh, Anne, forgive me! Please, Anne, speak to me! Anne! Are you hurt?"

She lay back with eyes closed, limp, scarcely breathing. But the effect of this imposture was so heart-rending upon the boy, who broke into real wails and begged for Charles to come, that she laughed suddenly and uproariously into his face and seized his mop of blond hair to roll him in the warm sand.

Buckingham was so entirely relieved that she could have hit him with bricks and he still would have laughed joyously. After a little she let him up and said she'd race him into the water and so away they went to burst through the surf and send showers of glittering spray like diamond fountains above them.

Laughing in his turn, Martel recovered the ball and sat upon it, looking after them.

What a change had come over him in a year and a half! Had anyone said war to him he would have looked up quite blank and wondered what war was meant. His sandy hair was no longer gray about the temples and the lines about his eyes had vanished. He laughed easily and often and whistled as he went about. The great strength of him was visible in every corded muscle of his brown body.

The eighteen months had been good to him. But for the first six, struggling with finances, searching incessantly for food, Anne had often wondered if his eye would ever light again or his laugh ever sound. But faithfully she had kept to her task, knowing no rest, thinking of herself not at all, pushing back all the terrors and horrors of her life with a strong self-denial which at last had banished them from view.

Charles was writing courses on nuclear physics for the French Academy's distribution and with long uncollected royalties on previous works, was mending their fortunes. But his prize work which he most enjoyed was a book, nearly completed, called "Negative Energy Flows: A Neglected Field with Some Notes on Future Potentialities in Life Creation," a work which absorbed him deeply. But it was Anne to whom he devoted his interests and when she had become Mrs. Charles Martel in the small chapel near their smaller home, Martel had thought he would never feel richer if he made all the money in the world.

He called her Anne of Austria and bought her baubles and bonbons and nosegays wherever they could be found. He made her a queenly

crown of cardboard and then when she took it so well, gave her the real gold one he had wheedled out of an impoverished nobleman nearby. The sun came up and went down to the east and west of Anne and Martel felt himself an emperor at least.

She was so busy with collecting the rent on the villa—which she had let to a manufacturer from Italy who seemed to possess great and mysterious hoards—and running their own cottage and coaxing provender out of tradesmen and copying manuscripts for Charles in addition to the enormous primary task she had set herself, that she was hardly aware of the change in herself. But she looked like a girl of sixteen and there was a youthful bloom upon her and laughter in her eyes which never had been there before.

Buckingham had crept into their lives, an English boy, abandoned in the fall of France, without any slightest notion of what had happened to his people or whether he had relatives alive. Years of privation had reduced him to a bony shadow, had nearly destroyed his memory, and had taught him tricks and usages which no high-born English lad had ever known before.

Charles and Anne had scrubbed his body and his heart, had filled him full of vitamins and food, and had talked of sending him to England some day. But that talk grew desultory and for some months had not been heard at all. Instead Anne had taught him English all over again, complete with an accent and "By Jove" and Charles had begun a technical education in soil so fertile and quick that Martel was nearly burst with pride. Buckingham would have swum an ocean or walked barefoot to the Moon if he had thought there was the slightest necessity to do so in the cause of his foster parents. And outside of a propensity for waking up everybody with a terrific nightmare in which he was being bombed or tortured or starved, Buckingham fitted well into the household. No son ever considered himself more fortunate in parents and no parents ever so respected and loved a son.

The little man on the walk above twisted and darted his lensed eyes about, looking closely at Martel in puzzlement and then ducking only to be drawn into staring again as though he was a needle and Martel a magnet. He was entirely unable to make up his mind whether this was Charles Martel or not and the direful consequences one way and the hoped for relief the other kept him spiked to the spot. But Martel was not paying any attention to him for there were other people about and who would notice a street cleaner?

Who? Some minutes before a low gray car had crept down the street and parked directly across from the hand cart which the little man had abandoned. In it were three men, heavy and purposeful and until now very quiet.

One of them smoked an eternal cigar and gazed at the beach with a placid air of having forever in which to work. He was plump and

comfortable, satisfied with existence in general and particularly with his own.

The second man was from a rougher mold and about as oily as sandpaper. He had a photograph in his hand which he was comparing with thoroughness—a faculty which he substituted for brains—which almost wore it out.

"I guess you got him, Mr. Banks," rasped the second man. "This here picture and that there street cleaner's the same man or I'll eat 'em both." He clapped his jaw shut as though already masticating this strange food and looked with some servility at Connover Banks.

The third man was French, portly and flustered. He was the head of the Sanitation Department and he had an eye on his future. "I assure you, Mr. Banks, I assure you with a certainty that this thing I did not know! A dangerous criminal, a very dangerous one if I am to believe . . . but of course how could I otherwise than believe—"

"What nationality was he?" smiled Banks.

"Oh, but of course how could he be anything but French? His papers—"

"Papers!" laughed Banks. "No, no, Gritter. Don't arrest him. Always so anxious, eh, Gritter. But not yet. That man on the beach, you know him? I think it would be very profitable to wait and find out just why our little street cleaner is so interested in Captain Charles Martel." He continued to smile pleasantly. He could wait.

Anne and Buckingham came yelling out of the surf, the famous round rollers of Biarritz. The boy, displaying one of those odd skills in which he had been so long and painfully trained by war, had caught a fish in a cleft in the rocks. He raced up to Martel and displayed his triumph, waiting with eager blue eyes for the master's praise. It was a ten-pound beauty, a prize indeed to a house two days without meat.

While Charles pronounced him a very prodigy amongst anglers, Anne went swiftly into the small beach bathhouse and came out shortly afterwards, still arranging her hair, dressed for the street.

"And whither goest Her Highness?" said Martel.

"I have a date with a man," said Anne, looking sly—or looking what she supposed to be sly—for such an expression would have been strange indeed on that bright young face.

"I'll tear his heart out," said Martel.

"Oh no you won't, sir. He's promised me fresh greens and a dozen onions, and we can't dine on fish alone. Besides, he thinks you're wonderful."

"So that makes it fine," said Martel, pretending great ferocity.

"Aw, she's talking about old Cancan Thibault," said Buckingham. "I swear, you'd think she was royalty the way that grocer scrapes and paws in front of her. I guess I know. He even forgave me—" he stopped and blushed.

Martel looked down at him. "What have you done now?"

Buckingham looked unhappy and

then, with the air of one who is happy to have but one life to give for his country, straightened up and blurted, "I took three heads of cabbage off his stand with a pole and hook three months ago and he had put a bell on the last one."

Martel sighed. "Didn't you have money to pay?"

"Sure I had money to pay, but a fellow has to keep his hand in! I was going to pay—"

They were both laughing at him so, for a moment, he appeared undecided and then wriggled himself into a suitable stance which was supposed to be contrition. But he couldn't hold it and suddenly burst out laughing, too. He knew they knew they had convinced him about stealing. He wouldn't steal now, not for anything. He was a gentleman, wasn't he? Charles said so.

Martel went into the bathhouse and changed his clothes and when he came out, both Anne and Buckingham were gone, the latter bound for home and a quick cleaning of his prey.

Possibly Martel's life would have gone on as happily as it had in this interlude if the old man on the walk had not beheld him now, face to face, dressed.

The thick lenses peered, the mustache quivered. With a terrible squirm and a moan, the eavesdropper forgot all caution. The man *was* Charles Martel.

Dropping broom with a clang against the handcart, the street cleaner sprinted up the walk with only one thought—to put distance between himself and Martel.

Puzzled and instantly alert, Martel searched his memory for that face and manner and then, with a startled exclamation, darted up the walk in pursuit.

"Professor Haus!" cried Martel. "Wait!"

But the suddenly titled street cleaner had no mind for waiting. Biarritz had become much too small. The perfectly rounded combers, so delightful to the painter, had lost their enchantment. The green, pink and yellow villas and houses which stepped neatly up the mountains, the grape arbors, the lemon groves, the olive trees, the impressive hotels and pleasant lanes had all, every one, formed a gigantic plot to imprison him, and his heart hammered like a machine gun more from terror than exertion.

"I must get on. *Ach,* I must get on!" And he got on with remarkable agility so that he was shortly sprinting up a steep, winding street between two villas. The grade was too much for him but the danger was too pressing to allow him to stop. One hasty glance he threw over his shoulder to discover that Martel was less than a hundred feet behind him, and then he sped with renewed energy. But it was an energy sucked upon by terror and he resorted to a hare and hounds trick.

Professor Haus turned the end of the villa and darted instantly into a garden door which he slammed behind him.

He pressed anxious ear to the panels and his eyes bulged hugely behind his glasses while his old

heart sought to spring straight through his ribs.

He heard Martel stop and cast around him and then start away. But his triumph was brief. A huge voice behind him bellowed:

"What are you doing here?"

Haus whirled and there against the soft, Oriental garden was the roughest butler he had ever seen. But butlers were nothing to the old professor beside Martel. Haus leaped like some demented chimpanzee for the fellow's throat and the giant screamed in terror and scrambled hastily back, tripping over a pot and falling with it into a flower bed. Haus left him with an arbor of crushed geraniums and darted across the main court.

A tea table was bringing a belated breakfast to two old men. The table was a portable affair and its pilot was an ex-soldier who felt that valor before his employer would not go unrewarded. He made a barrier out of the table at a strategic moment and Haus crashed into it. Pilot and table, cups and pastry and chocolate tangled up in a horrible crash. But Haus was afoot, running and halfway over the wall. He stopped for an instant at the top and glanced back at the ruin he had left but the sight of Martel coming through the gate acted as a strong projector upon him and Haus was flying at doubled speed up another lane.

There was a lemon grove to his left and beyond that a ditch which made a sort of earthwork and Haus changed his course for this fortification. He knew he could not run much farther. He flopped over the top of the rampart and went up to his ankles in an irrigation ditch. Promptly, as though the shock of the cold water had restored his courage, he peered back over the parapet and from his pocket drew a 9 mm. Luger. He put a shell under the firing pin, estimated the range and waited.

Martel had been slightly detained by the necessity of apologizing for his intrusion and helping first the butler and then the ex-soldier to his feet and finally by going out the gate and around the wall—for there was too much silver plate in his right leg to permit athletic ascents.

He stood for a moment at the corner where he should have discovered Haus and, not finding him, got his breath back. He pushed a hand through his dampened sandy hair to take it out of his eyes.

"There is no fleetness like the wicked's!" said Martel and grinned. This was an awful lot of trouble he was going to just to tell a man that he needn't run halfway across Europe out of fear.

His practised eye explored the way with an expertness cultivated only by the surpassing danger of hunting that most deadly animal—man. He found the footprints in the dusty furrows of the lemon grove. He traced them a short way through the trees. But he did not move from the spot.

Affecting the most casual manner possible—but not so casual that he whistled—he sauntered back along the villa wall and vanished.

Haus watched him. But Haus knew a thing or two and he promptly shifted his position until he was around a bend in the irrigation ditch and could command his old spot. He then gave twice as much attention to the area back of the ditch as he did to that before it, carefully marking down all cover, sketching how it would be utilized. And then, for all his precaution, his hands began to sweat and he began to tremble. He knew that this was all wrong.

He waited for nearly ten minutes and still nothing happened. Suddenly an awful fear took him and he whirled.

Martel was fifty yards away, behind Haus, having come into the ditch from the farthest end.

Haus threw a quick shot and sand leaped off the bank while the ricochet howled away on dismal wings.

At the first sign of Haus' turning, Martel went over the bank. He was entirely under cover when the shot arrived.

"Professor Haus! Don't shoot. By the gods, you give a man a lot of trouble."

"Keep your distance, captain! By this I do not mean to be taken!" And he shook the Luger at the empty scenery down the ditch. "You throw your gun into sight and I promise you dot I will let you go!"

Martel made no answer and there was no sound. This unnerved Haus. He did not dare to rise up to see if Martel was still on the other side of the ditch and he dared not go away and so expose his back. What was Martel doing?

Presently there came an answer to that. On a twig plucked from a lemon tree, a white handkerchief was exposed to view.

"A trick!" cried Haus. "Come up, your hands into the air."

"Put down your gun, professor. This is no trick. I am not with any government anywhere and I haven't the slightest interest in taking you. That's why I chased you. To tell you that."

Haus blinked and fidgeted with his Luger. Oh, if this were only true. What a lot of running away it would save him! He was very tired of running away, was Haus.

Silence ensued but the twig was still in view and the handkerchief was fluttering. Haus speculated. He knew nothing but good of Martel, but one gets out of the habit of trusting—yes, and hoping, too.

"You stand up as you say if this iss true, Martel."

"Stand where you are, professor," said Martel coolly.

Haus leaped half a foot into the air. The voice had come from behind him!

"Don't turn," said Martel. "Lay your Luger down on the bank. Carefully now. I wouldn't want you to get sand in it."

Haus trembled and tears started into his eyes. He pushed down a sob and laid the gun as he had been directed.

"Good," said Martel.

"You von't take me away," said Haus.

"I'm afraid I must," said Martel, retrieving the Luger.

"But I will you—Ach, how horrible. All these years and now—"

"But I shan't take you any farther than to dinner," said Martel. "Turn around, Haus."

Haus' nerves were buffeted enough without this. But he turned, head lowered, lip trembling. He opened his eyes to stare at the Luger which, unaccountably, was extended to him butt first. Hope struggled up behind the thick lenses but still he wouldn't touch the gun. This was an old trick. Bait. Shot in self-defense.

"Take it!" said Martel. "Put it in your pocket."

Haus finally took it, saw that it was still loaded and then put it in his pocket. He looked at the extended hand for a little while and then, with a long, shuddering sob took it and sank down on the bank to cry uninterruptedly for four solid minutes.

Martel looked down at the curving white beach and the flags on the hotel roofs. He puffed on a cigarette and admired the scrubby hills. After a little while he went down and retrieved his pocket handkerchief, which he gave to Professor Haus.

"Blow hard," said Martel.

"Now come along," he added. "My boy caught a wonderful fish and dinner will be ready in no time."

Haus blew his nose and wiped his misted glasses and combed the tears of relief out of his huge mustache, and soon came along very handsomely.

In the dining room of the small cottage, Professor Haus picked his teeth with a bone of the fish and gazed with benign satisfaction upon the lace-covered board and its empty dishes, upon the silver service of the buffet, upon Anne and Buckingham.

He was garbed in one of the latter's jackets—for he quite would have disappeared in a coat of Martel's—and a pair of that young bandit's slippers, and having washed mustache, face, hands and ears, Haus looked entirely different from the street cleaner of a few hours before. The great lenses sparkled, the rough voice was softened by occasional chuckles.

Martel had not told Anne anything other than that Haus was an old friend. Had he added that he and Haus had been swapping shots and crossing trails for years, Anne would have been frosty, and had Martel added that one of these shots had just missed him, Anne would have been savage to the little professor. As it was she merely identified his speech as having a Polish accent and thought very little about him otherwise. She did, however, experience an uncomfortable feeling when she left the table as though she was departing from an era through which they had passed happily. This she put aside and motioning to Buckingham to come on and leave the men alone, there was shortly heard the distant rattle of dishes in the kitchen as that worthy began to wash dishes and the mutter of a history lesson going forward the while.

Haus beamed upon Martel, took

the proffered brandy glass, sniffed at the fine liquor, and toasted Anne.

"Royalty, my old friend," said Haus. "Not less than royalty. Such charm, such beauty, such grace. Ah, it carries one back to the great days of Warsaw, the balls, the fine dinners, the jewels and lights and music. *Ach*, my dear Martel, how rich you are. I give you Lady Anne."

Martel was certainly nothing loath and they toasted her twice.

"And your boy, the urchin you—'

"He's no urchin," said Martel quickly.

"Ah, yes," but Haus had his suspicions. "He seems quite devoted to you. Dot is a fine thing, to have a boy devoted to you. And a handsome fellow. Of course, there is something in the way—"

"Buckingham is a good lad," said Martel, quickly divining that Haus felt antipathy toward the boy on no other grounds than that Buckingham was already taller than Haus, that he hated Germans.

"Of course. Tell me, my old friend, what have you been doing with yourself these past few years?"

Martel told him back to eighteen months and that quite simply. But as he spoke he had the odd feeling that he had been born eighteen months ago, had lived that life and was now laying it aside.

"And now you," said Martel.

"*Ach*, there is little enough to tell. When war broke out, you know what I was doing."

"Certainly. You were trying to swamp the world with German cul-

ture," laughed Martel. "And what a violent effort it was!"

Haus looked at him fixedly and set down the brandy glass. "You believe maybe something. You believe maybe I helped start this war?"

"Well, as Hitler's foremost political scientist—"

"You believe I tried to start a war with cannons? You believe I meant for men to get killed over silly stupidities? You think maybe I meant for airplanes to bomb cities and millions to be dumped in common graves? You think this?"

And thereupon Haus startled Martel by laying his small ball-on-a-stick head down on the table and weeping until the portieres shook with the violence of it. Martel urged brandy, but Haus would have none of it. Martel tried patting him on the shoulder consolingly, but Haus only wept the more.

Only the appearance of Anne, attracted by the wails, made Haus stop and rapidly dry his eyes upon a napkin and wipe his glasses in a furious effort to be utterly calm and collected.

"The war," smiled Martel.

But as she went out carrying the last few dishes, she stopped in the doorway and looked back wonderingly at Haus. Suddenly she stopped and came into the room again. She looked hard at the guest.

"At last!" said Anne. "Professor Haus! Certainly, I know you professor. You lectured at Vienna in nineteen thirty-eight and the SS guards stopped you!"

"There!" cried Haus. "There! Now you see, captain? You see. Tell him, dear lady. Tell him!" And he pranced back and forth behind his chair, now pointing to Martel, now nodding vigorously at Anne.

"Yes, what happened?" said Martel, amused.

"Why, he was speaking about science being truth and went so far as to advise that the Viennese scientists get out if they wanted to keep on thinking or some such thing, and then an SS spy leaped up on the stage and thanked the audience right in the middle of the lecture and they hustled the professor away in a staff car. I remember well because he was to have had dinner that night at our house and father came home to tell us about it. We were very upset, but father discounted it only to be imprisoned the very next year when he would not co-operate with them."

"See, see, see!" cried Haus, jumping about. "Thank you, my dear lady. *Heraus mit der Nazis!*"

Martel was quite surprised but he spoke to conciliate the old man and get him seated again. The bait of another glass of brandy accomplished this.

"Well, now at least you have partaken of the promised dinner," said Martel. "A bit late, perhaps, but pleasant nonetheless, I hope."

"Indeed. Dinner to a starving man now. Dinner to a heartbroken if vell fed political scientist den. Ah, my dear lady—"

But Anne had returned to the kitchen and the door, still swinging, gave punctuation to Buckingham's

chant about King Charles Fifth . . . Netherlands . . . stabled . . . an—.

"So they weren't popular with you?" said Martel.

"Nazis? Popular? *Ach*, und me a Pole! Bah, I spit on the Nazis, I grind them under my feet. I tear out their—"

"Not so loud," said Martel.

Haus came half out of his chair and poked his lenses fearfully about him and under the very silver before he realized what year this was and where this was.

"Tell me, then," said Martel, "what you really did."

Haus fortified himself with a strong slug of brandy, hitched his chair sideways and spoke in a very confidential voice.

"I was a trained ape. Trained mitt hot pokers and the food away taken. A trained ape. My family in Poland was—" He sucked back an imminent tear— "And before war started I was confidence itself. Yes, I thought the brain of Haus—this poor, withered old apple of a brain—was greater than that of any Nazi. Vell, maybe my brain was great, but what I lacked was the cruelty. The cruelty of the beast. The sadism. I was not enough of a brutal murderer or a coward. Zzo! I was wrong.

"In nineteen hundred and thirty-three they needed me. Ah, they flattered me. I was teaching at the University of Berlin and three of my pupils came to me and said they had found a better position for me. It paid marks like to planets a train would take days. It gave things. My family was poor. There was little to eat. And all they said was, 'Here, great Professor Haus, you who are the world's greatest living authority, perhaps the greatest who ever lived, on political sciences, you to whom nothing human or political is any mystery, permit us at your feet to sit and become informed of how to make Germany a great, prosperous, peaceful nation, respected among all nations, admired as is the sun.' And I said yes.

"So they came. Nobody at my feet sat but many before my book sat. And when a year I had worked they came to me and said, 'Herr Professor Haus, Der Führer thinks you a genius. Come teach this master of all Germany how to be a great ruler.' Und I vent.

"Now maybe I should have remembered what happened to der writer Machiavelli when he wrote the 'Prince.' A great book, the 'Prince.' A great work. A demonstration of great political genius. And what happened to Machiavelli? *Ach*, to a Nazi it should not happen. Minister Colbert of France, he read how to become powerful, he forgot to read how to be a great ruler. Cardinal Richelieu? He read how to be a great manager of kings and lands, but forgets how Machiavelli says to make kings and lands happy. Napoleon? Frederick? Catherine? *Ach*, but you know the story. I forgot the story.

" 'Professor, my dear old friend,' says the arch-fiend Hitler. 'My staff and guide, my dear Haus. Teach me how should Germany great become. Please teach a willing pupil.'

"Und ZZZzo! I teach him, der . . . vell, anyway, I teach him. And to the sentences and ideas which he already knows, he agrees, you see?"

"A man isn't likely to learn more than he knows," said Martel. "Brandy?"

Haus took the brandy and gulped it down. "Ah, yes. He hears what he knows already and the rest he does not hear. I sit and talk of peace and happy people and food and great admiration by the world und dot Hitler! *Ach, der*—vell, anyway, he hears nothing.

"Then he says, 'Herr Professor, make me a program to create Germany the greatest nation in the world.' And I go and make him a little personnel essay all about it, mitt drawings and statistics, all very neat. And when this he gets, he says, 'But my dear professor, all you have written concerns the German scientist, not the people.'

"So I tell him, 'The people need food and peace, to raise children and amuse themselves and happy be. The scientist in Germany can create food and health. The one asset which Germany has is her scientific man. Her warriors, phooy! War after war she has lost and will lose with her warriors. Pig-heads, her warriors! Nobody ever won a war. Nobody anywhere.'

"'A successful war would make the world respect Germany,' says der . . . vell, anyway, he says so. And I say, 'Already the world respects Germany. All the chemistry in the world is led by Germans. Physics. Engineering. Led by Germans. Everywhere, people know this. If German scientists could have all they needed with which to work, they would control all the industry in the world and be thanked for doing so, and everybody would be happy and nobody would get killed, which is stupid.'

"Der . . . vell, he smiles. 'Control all industry? Scientists?' 'Industry,' I say, 'and all is industry now. Make Germany the fount of such great discoveries and developments that the world is free from disease and suffering. Germany will be great. A thousand years of human greatness will result and everywhere you go everybody will shout "Long Live Germany, the greatest nation on earth!"'

"ZZZZo! In two days he sends for me again. Und this time, how nice he is! 'Herr Professor Haus, a school you make for me. A nice big school. The money I give you. And in this school you teach all you know about races and peoples everywhere. Your idea, it is wonderful. So make a school so we learn what the world needs every place and what the world knows and does not know. Und what the world is doing and what the world is not doing. All this you will make for me, Herr Professor.'

"What else can I do? I go and the school make. I am all excited. Haus takes a hand in building a new world, a magnificent world. And for a year I build the school and teach and give books to the young instructors. Und everything is going fine. But there is one trouble. I have not enough informa-

tion to teach what I am supposed to teach. More data. And more data. What do they do in South America? Who should be made happy in the United States? What peoples are down-trodden und why? Und what can a German scientist do to untrod them?

"ZZZo! Back to der . . . vell, I see Hitler. I tell him. 'Ah, Herr Professor, my good and loyal friend, for you I was about to send. I have heard that once you wrote a book on the procuring of information.' And, thick-skulled imbecile that I am, I say yes. 'Herr Professor, for me, then, you will construct a textbook on how to do this thing. And more. You take an active part in making it so. Then we can find out all the fine things you want to know everywhere. And there is one especial thing I want you to do. I want you to have for me an always up to date list of the scientists of the world, what they are doing and why and how soon they will finish. Then the German scientist can work harder and solve his problems better.'

"To me this seems very beautiful. Und so I go and I make up a book. Did I know I was writing the basic intelligence system for Germany? Did I know that dot pig-brain Rudolph Hess would add to it all the Japanese methods he had learned by way of torture and counter-espionage? Did I know I was about to hound millions of people from their wits out? No, I write a book. Like Machiavelli I hand out wisdom und nobody reads but the first page und crazy go.

"ZZZZZZo! When the school is running und geopolitics is getting taught, when the book is written and an intelligence bureau I start, who comes to see me? Der . . . vell, was it Hitler? NO!. It was a squad from the SS guards and they keep me under lock and key like a criminal. And I don't see the school. And I don't lecture on my book. But all day long reports I sit and file about scientists. And if I complain, the SS guard is there to see nobody shoots me. And if I want to know what is really happening, why they say they can't distract me with petty things because I am so great. And there I sit and make up dossiers on all the scientists in the world and wonder if I am a prisoner or if I am just protected.

"Comes Austria. I go. The troops are nice to me. The officials bow from the hips to me. I start to make an address and I am arrested like a bread stealer. *Ach!*

"I see Hitler. I complain. I say I will no longer make up dossiers on scientists or help because I see so plain it is to war he is going. The world he has by the teeth and yet to war he is going. *Ach,* dot—vell, he was not bright, God roast his soul. He calls me his Herr Professor but I tell him no more information, no more geopolitics, no more anything. Und he pulls out a photograph of my dear, dear wife and my two liddle poys—"

Haus stopped and sobbed.

"What did he do?" said Martel.

"So I work until nineteen hundred and forty-three making dossiers. I find out about your atomic

bomb. I find out about the people and the projects. I learn about submarine mousetraps, about bazookas. I list new scientists, where they work and what they do all through the world, und all I can have happen to hurt the Nazis is to suppress information which would really help.

"ZZZZZO! I suppress one piece of information too many and away I have to run. Run away I could because the Russians territory have taken and my wife and little boys are in their hands. So to the Russians I go, full of hope. I get through their lines und they take me to a commissar and the commissar says yes, my wife and children are in Russian hands and a photograph he shows me. And then he makes me swear I will behave if they'll keep me out of jail and the—" Haus choked with suppressing the volley of violence which sought to escape.

"I go back to Germany as their spy. With you I swap shots. With the Germans, I swap shots. Me, an old man. I act like a common spy. And the Russains are worse than the Germans. Worse! They are so stupid they will not even ask me for the mine of information I carry in my head. But finally a bullet I stop and in the hospital a general sees me and suddenly realizes who I am. *Ach,* if I had just died there!

"Back to making dossiers I go. But do the Russians want Nazi scientist dossiers? Himmel, no! They want allied dossiers. They want to know what all the scientists are doing. So I reconstruct the system. And then what? Why, the pigs will not believe anybody had done so much anywhere and they threaten to shoot me.

"But the Russians forgot they had made me a spy. They forgot I could also spy in Russia. Und I learn dot my vife, my liddle poys—"

He really broke down then and wept without restraint for three and a half minutes. Brandy had no charms.

"What happened?" asked Martel.

"So there is no use to stay and away I run. But the French in nineteen forty-four will only arrest me. Nobody will touch me. I contact undergrounds, both sides. The pigs get more and more stupid in a war. I run and run and run and—" He controlled himself and wiped hard at his glasses. "I become a street cleaner in Biarritz and here I have been for three years."

"Passport?"

Haus was suddenly touched in his professional pride. "Would the greatest intelligence officer in the world have any trouble with passports?"

Martel laughed and poured the brandy. "You are quite right, professor. There were very few intelligence men worthy of the name. And you were the greatest in Germany without question, if not in the whole world. But I despair to think how you would clear your name."

"*Ach,* to clear my name I would give my arm! Only for this reason

have I maintained liaison with some of my old workers."

"What? You retain contacts?"

"Of course. I have amassed documents and documents and perhaps in a little while I can prove I was an unwilling Nazi and a forced Russian. Captain Martel, you no idea have what it means to be brains amongst wooden-skulled thieves and idiots. Would I work to kill millions? To bring unhappiness to millions upon millions more? To ruin countries all for the sake of the extension of some national dominion? What matters it at all whether Germany or Russia collects Polish taxes if the personal freedom of the Pole is guaranteed? What does it matter if the whole world is owned by one man or a thousand men so long as the individual is happy and can pursue his natural vocations? Did it matter whether Charles the Fifth or Henri the Second ruled Europe in fifteen fifty? Was there any choice between their stupidity and profligacy? Then what is the difference now? Individual freedom, the dignity and nobility of the individual man is the important thing. Patriotism was a mechanism invented by Machiavelli who played upon a man's natural love of his soil to enslave his heart to a king. King is not soil. The trick of patriotism is to make it seem so. Nations rob and pillage and tax. A few wax fat on the sweat of the millions within it. Freedom? There is no freedom not allowed by the vested interests of the world. Freedom? There is nothing but slavery anywhere. Advertising, propaganda—what difference? Buy France! France will make you free! Buy Russian, Russia will make you free! Bah! A plague overtake the cunning and sadistic minds which call themselves political and are in fact industrial and capitalistic tools. Is there any freedom today? Is there any freedom anywhere that is true freedom? If a man behaves in the feeling that he is free it is because he has been taught a certain connotation for freedom in his extreme youth and if he follows that rigid connotation, he is 'free'. But is he? Or is he hemmed and guided and spurred and spurned the instant he begins to display any talent for original thought. He is free like the ox, my friend. He is given his oats so long as he behaves and pulls the cart that carries his national flag.

"Nationalism will destroy this world, Charles Martel. For the mind which is revered through all the world is the mind of greed and avarice. The only mind which can benefit humanity is that which works and gives all it has to bring happiness to the world. But no hat tips to the altruistic mind and the kind heart. All headgear sweeps to earth when greed and avarice as represented by money and selfish power rides the juggernaut into the scene. Think on that, Charles Martel. Think on that. Unless all mankind realizes that unless it learns to support and revere those mentalities and personalities which can improve man's chances of survival, those very wits will be used as tools in the hands of petty schemers prominent in the histories as great leaders,

to enslave, enfeeble and finally destroy Man. Before five years are out, there will not be enough left of the United States, Europe or Russia to get together the information required to make and strike a match. The criminals will perish with the innocent. But what is satisfaction like that to a dead man? Man and this culture deserves to live, Martel. Who is there to make sure they live? Nobody, my host, nobody!"

For a little while Martel sat and watched his guest in silence. The little man, who substituted nerves and motion where others used muscles and appearance, was quite exhausted and wrung out by his violent discourse. It took three large glasses of brandy and two fresh napkins to retore his equilibrium.

"Mr. Connover Banks," murmured Martel, "would call you a 'Communist'."

"A communist!" cried Haus, all fluttery on the instant.

"No, no. I would not. You don't know Connover Banks."

"Ah, but if he would call me a communist or a socialist or a democrat or a double-blue-eyed stinkpot for uttering those sentiments, then I know Mr. Connever Banks. Such men, and don't think I don't know them, brand anything which would unseat them with a name which they have carefully made detestable to everybody so nobody will listen to truth. I am no German. I am no Russian. I am a political scientist and the finest in the world. What do I care for flags or government—"

Martel hurriedly stopped him. "No, no. I share many of your sentiments. But what is this you say about five years; why five years?"

Haus instantly became the conspirator. He hitched his chair sideways though it moved not a quarter of an inch. He regarded all the doors with grave suspicion and even seemed half-minded to look under the candlesticks. In a hoarse whisper he said, "Martel, I trust you. I am expert at reading faces. I see that you are honest. My good friend, Jules Fabrecken and his crowd have given an atomic bomb to Russia and all the facilities to produce more. They are seeking to promote a war between the United States and Russia for those two countries alone, in all the world, oppose them. Fabrecken only wishes to maintain the *status quo* in the world of economics and invention. If no new ideology and no new weapon or defense against the atomic bomb appear then Russia and the United States will cease to be a menace to him. He will become, in effect, the dictator of the whole world. Connover Banks, your former employer on the Allied War Crimes Commission is the chief lieutenant of Jules Fabrecken.

"The first interest of Fabrecken is to prevent any new ideas from arising and to do this he is either killing, capturing or buying off every scientist he can lay his hands on. There is a small group organized to oppose him. We need the brains and initiative which you can offer. For *ach Gott*, you sure displayed them in the recent war.

But this is a bigger war than that one.

"If the world falls under the complete dictatorship of Fabrecken and his crowd you can kiss your science good-by and the dark ages all over again will start. It is impossible for us to stop an atomic war but it is possible for us to save what we can of science and maybe, who knows, maybe we can completely overthrow and defeat Fabrecken before all mankind is thrown in the gutter."

"I have suspected this," said Martel. "I have seen the signs but how do you know?"

"I," said Haus, "am the greatest intelligence scientist in the world. I have files, I have means, I have names, I have contacts. The group even has a secret headquarters in a place not likely to be found. I tell you all this because I know you are honest. I tell you this because we need your help. *Ach Gott,* how we need it."

"You have files," said Martel.

"*Ach,* yes, und a laboratory. Please, Charles Martel will you help us?"

Martel sat quietly for a little while. "You really have the evidence that Fabrecken means to let the war between the United States and Russia go through? Then, by keeping all new thought corraled for his own personal use to rule the world?"

Haus, tears in his eyes, nodded vigorously. You come to my house to-night at nine and I will tell you more. You will help?" They were at the door now.

"Shall I come with you now?" asked Martel.

Haus shook his head violently. "Still for a little while streets I must clean. But tonight at nine? *Ja?*"

They shook on it and soon Haus the street cleaner was handed out the door with many compliments to Anne, many bows to Martel and even an effort to be nice to Buckingham.

"A funny little man," said Anne.

But Martel hardly heard her. So great was his preoccupation that Buckingham was alarmed and stood in the doorway for some minutes, looking at the stairs where Charles had vanished and into the street where Haus had gone.

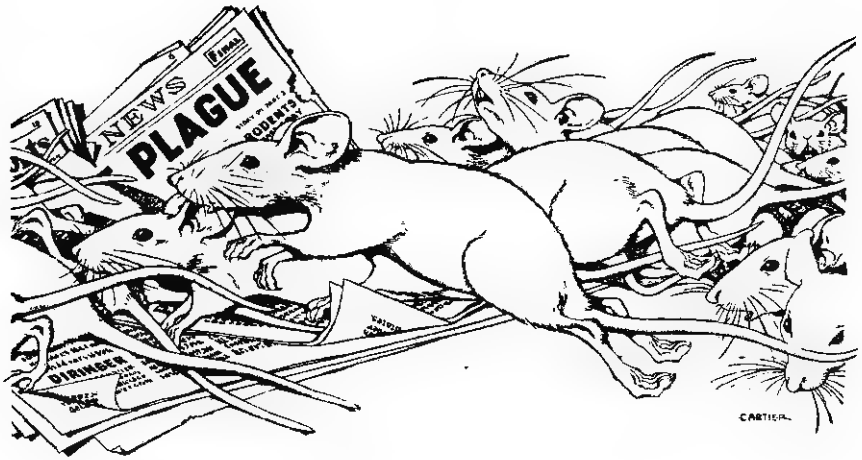
Suddenly Buckingham grabbed a cap from a peg. He kissed Anne on the cheek on his way through the parlor and in reply to her pursuing query, said mocking Haus:

"*Ach,* a hunch I got," and rapidly went on his way.

A chill hand clutched at Anne's heart and she rose from her sewing to call him back. But then she sank into her chair. Rule her world she might, but there were some things on which men were entitled to act alone.

She began to sew and found, suddenly, that her work was blurred by her tears.

TO BE CONTINUED.



RAT RACE

BY GEORGE O. SMITH

***The** idea was to build an electronic gadget; that it turned out to be a rat trap was purely accidental. And that it turned out to have the highly undesirable effects it had—*

Illustrated by Cartier

"You're nuts," came the reply, but the voice on the telephone was jovially reproving rather that sarcastic. "I can't do anything about this order."

Peter Manton blinked. "But it has a Four-A-One priority."

Brannon nodded—invisibly, of course—and said, "Sure you have a top priority. Anything your lab wants has top. But darn it, Peter, the best priority in the world isn't going to buy you a dozen mousetraps that are nonexistent."

"But—"

"Besides which, that building you're in is about as rat-proof as a sealed gasoline can. There isn't an item of comestible in the place."

"I know that. And the mice can go hungry for all I care. But the mice don't seem to understand that bringing food into the place is not only forbidden by law but dangerous."

"But there ain't a mousetrap in the country. Ding bust it, Peter, mousetraps take spring wire, and

labor. The people who used to make mousetraps are now making bombsights and tanks. Besides, Peter, over at that laboratory of yours there should be enough brains and gear to really build the Better Mousetrap. If you can spot a plane at fifty miles, split atoms, and fire radio equipment out of a cannon, you ought to be able to dispose of a mouse or two."

Peter grinned. "You mean spot 'em with radar, and then shoot 'em down in flames with proximity fuses loaded with plutonium war heads? That might be a little strenuous, don't you think? Like cutting the throat to stop the spread of impetigo."

"Well, if you have mice over there, you think of something. But top priority or not, we can't get you your mousetraps!"

Peter hung up unhappily. He turned from his desk to see an impertinent mouse sitting on the floor watching him out of beady black eyes. Peter hurled a book at it and swore, a rare thing for him.

The mouse disappeared behind a bank of filing cabinets.

"That's right," he grunted. "Go on—disappear!"

The word struck home. Peter blinked. And remembered . . .

It was dark, though not too dark for the mouse to see his surroundings. It was hungry, and it was beginning to understand that of the many places occupied by man, this was one place where man left nothing that could be eaten. This evening, however, the situation was changed. There was a faint smell of food in the place, relatively great compared to the sterile atmosphere of previous days.

The mouse located the odor. A small wire tunnel closed at the far end. A nice, rancid bit of bacon hung there.

The mouse was no fool. He inspected the wire tunnel carefully. Three of his brothers had been taken away by various metal contrivances and he was not going to follow them if he could help it. The mouse sniffed the wires, climbed the top of the little cage and raced around it, poking it and bumping it. Often a trap could be sprung by poking it with a foot—just jarring it. That left the bait safe to eat.

But this seemed innocuous. No springs, no wires, no trapdoor, no mirrors. Just a little tunnel of wire cloth about six inches long and two inches in diameter.

The mouse entered the tunnel; headed for the bit of bacon.

Nothing happened, and the mouse gathered speed. It paid no attention to the silvery metal ring that encircled the inside of the tunnel, and would not have known what it was anyway. There were other things there, too. Bits of Alnico V, a couple of cubes of Cerise Wax, some minute inductances and a very small capacitor made of a tiny square of mica with some silver sputtered on both sides. Down in the center was a clear crystal with electrodes clamped on it. The whole assembly was about a half inch cubed and from it on either side

emerged the ends of the silvery-wire loop.

Had the mouse seen all this, it would not have understood. That was not strange, for even the man who built it was not too certain what it did, or what it was, nor how it worked.

He knew it worked, and it served its purpose. He was like the man who daily uses electricity enough to kill him, but is not quite sure of what goes on in the instant between his snap of the switch and the arrival of the illumination.

The mouse cared not. All he was after was food.

He paused, uncertainly and checked to see if there were any moving parts. There were, but they were intangible fields and stresses of space.

Then the mouse raced forward and passed through the silvery circle.

But did not come out on the far side.

A second mouse, watching, took a sigh of relief. The bait was still there. There had neither been cry of pain nor was there a captive warning the rest away in mouse-ese.

He, too, came to the trap, and entered, the odor from the rancid bacon drawing him with a magnetic force.

He, too, came to the silvery circle, passed through—into nothingness!

Came then another, and another, each pleased in turn that the bait was his alone for the taking. And as each one entered and disappeared, a tiny silent counter moved one digit higher.

Came morning . . .

And—

"Great Unholy Madness," exploded Peter. "If this is a rat-proof building, I am a Chinese policeman!"

Jack Brandt looked over Peter's shoulder. "How many?" he asked.

"Twenty-three!"

"Golly," grinned Brandt. "We're outnumbered."

"We won't be long if this thing works like this every night. This is better than the original ball-bearing mousetrap."

"Which?"

Peter grinned. "The tomcat," he said.

That was how it started. It went on for a week, passed through a huge peak of catch, and then tapered off abruptly. A month later, the trap had passed no mouse into—nothingness—for three days. The Better Mousetrap was placed back in the cabinet and forgotten.

For this was during the days of War, when he who was not fighting was working to provide the fighting man with what he needed. And Peter Manton's laboratory had too much to do in too short a time to permit even an hour's wonder or work on anything not directly concerned with the problem at hand.

The months passed. Peter Manton nodded knowingly when Hiroshima heralded the atomic age. He made penciled notes on the margin of the paper correcting some of the reporter's errata in describing

radar. He wrote a hot letter to OSRD complaining that the news release on the proximity fuse had been mishandled, that he knew the real facts. He followed sonar and loran with interest.

More months passed, and the peace which was raging all over the world continued, but Peter Manton's laboratory was disbanded. Much of the stuff was sold as scrap, and among it was the Better Mousetrap. It no longer worked. Its magnets were mere bits of metal alloy; its permanent wax-electrets were discharged. The crystal no longer vibrated molecularly, and besides, the wire loop was crushed beneath a pile of scrap metal.

The next time Peter Manton remembered his Better Mousetrap was when a friend of his mentioned that he wanted to move.

"Move?" asked Peter. "Where to?"

"That's the point," grumbled Tony Andrews. "There's no place. But I'm not going to stay where I am!"

"It looks like a nice enough place. What's wrong?"

"Mice. The place is lousy with 'em."

"Oh? Thought that was a fairly respectable place."

"It was," replied Andrews. "But lately—the mouse population has increased. Probably due to the lack of traps created by the war."

Peter nodded. "We had a mousetrap at the lab," he said with a fond smile of reminiscence. Then he told Tony about it, and the other man blinked hungrily. "That good?" he exclaimed.

Peter nodded.

"Can you build another?"

"Sure."

Andrews smiled. "Look," he said. "You are the man who built the Better Mousetrap. But the old platitude isn't good enough. The world will not beat a path to your door unless you make yourself known. This should make you famous."

Peter frowned a bit. "Is it that good?" he asked.

"It has one feature that will outdo all other traps," said Andrews. "In any trap, there is the corpse to dispose of. In this one, there is the disposal system built in. Look, you build one for me, and we'll form a company to build them."

"If you think so."

"I think so. How long will it take?"

"To build another? About an hour once I get the parts. Luckily there's a section of the Central Scientific Company handy. They have most of the stuff."

It took several days to collect the material, after which Peter called Andrews. By the time the other man arrived, Peter was finishing off the main part of the trap. He handed the thing to Andrews, who looked at it, squinted through the circlet of wire, and then poked a pencil into it. Where it came level with the plane of the circlet, it ceased to exist in a slick plane of cleavage.

Andrews withdrew the pencil and it was complete again.

"Great Harry," he shouted. "Where did you get that?"

"That," smiled Peter, "is something out of Campbell by Edward E. Smith."

"Who?"

"Writers of science fiction that turned out millions of words dealing with strange minerals, space warps, and the like. They used to spend their leisure hours thinking up something that would outdo the other. Actually," he said, becoming serious again, "the thing was discovered in our lab during the war. We were working on a closed means of radio communication—a method of wireless connection that would not only prevent the enemy from decoding or unscrambling, but which would be impossible to detect unless you were set up properly. Too many things happened under radio-silence that a means of communication might have prevented. Anyway, in our search for a new level of communications, we got this effect."

"Seems to me that it should be good for something."

"The trouble is that it can't be made any bigger. Once that loop size is changed, the effect is no longer there. We worked on it for about a month and gave it up because there it is and that's all that could be done with it."

"How about using it to pump water out of a sinking ship."

"Can't fasten anything to the ring," said Peter.

"But the thing that bothers me is where does it go?" asked Andrews, poking his finger through the ring and withdrawing it hastily as he saw the clean-cut cross section.

"Haven't the vaguest idea."

"You haven't worked on it much, then?"

Peter shook his head. "There were a lot of things that had priority," he said. "We had that scheduled for about three years from now, even. Anyway—what are you doing?"

"I'd like to know where the stuff goes," said Andrews.

"How are you going to find out?"

Tony Andrews handed Peter a key ring tag. It was an advertisement for an automobile salesroom, and it stated that any possible finders should merely drop the key ring and chain into the nearest mailbox; that the addressee would pay the postage. It then gave Tony Andrews' name and address and telephone number.

"Think . . . if it's found anywhere . . . it'll be returned?"

"That's how they sent them out." he said. "Darned good advertisement, too."

"But—"

"Look, Peter, if this . . . and it must go somewhere . . . lands close by, it'll be returned. Perhaps we'll get a letter, too, telling us where. If it lands in some distant country, we'll probably get it back with a letter telling us that I sure did get around."

"You feel certain that it will land somewhere on earth."

Tony Andrews nodded. "There is no pressure gradient worthy of the name across the face of this," he said. "Though there is a very slight motion of air through the ring. That means that the air pressure on either side of this ding busted ring is about the same. Funny, though, it sort of blows both ways."

Peter nodded. From either side he poked forefingers in. At the plane of cleavage, both fingers passed forward into—through—one another, giving an appearance very much like poking the forefinger into a pool of mercury.

Andrews shuddered. Then he took the little circlet, held the ring sidewise, and dropped the tag from the key ring through it. Through the ring they heard it clang onto the floor.

Peter took the ring from Andrews and put it horizontal, close to the floor. He put a finger through it and probed.

He said: "Ah!" and put thumb and forefinger through the ring and came up with the tag.

"What's down there?" asked Andrews.

"Feels like wood." Peter poked a ruler through and measured the distance. About two inches differed between the concrete of Peter's basement floor and the wood surface of the other.

"We'll lick that," said Peter. "I've got a tiny miniature camera upstairs. We poke it through and take a picture or two."

That was a flat failure, they found. The film came out utterly black. Whether the film was exposed in passing, or whether the "other side" was highly illuminated could not be determined. They could control the light in the cellar so that the partially "gone" camera would not cause exposure of the film. But if the other side were brightly illuminated, there would be an instant where the film was open to the light. They tried for hours, but failed.

Eventually, Andrews took his mousetrap home with him and set it up in the kitchen.

Again, its take was enormous.

Senator Treed entered the hardware store along Connecticut Avenue and asked the clerk for a mousetrap. The clerk looked surprised and said, "But you're living in the Wardman Park Hotel, senator."

"I know. Reputed to be one of the finest hotels in Washington, too. But, there're mice there."

"Hard to believe. Does the management know?"

"Not yet," said the senator quietly. "And say nothing, please. You see, Mrs. Treed and I just returned from a vacation in Wisconsin and we had a large number of packing cases delivered to our suite. It is more than possible that we included a few field mice. I'd hate to be held responsible for bringing mice into the Wardman Park."

The clerk grinned. "Mice in the Wardman Park. That's a national calamity, isn't it?"

Senator Treed scowled. "Young man, this rat plague is a national calamity. You do not realize how

bad it really is. An outbreak caused by the war."

"Come now, senator. Don't blame everything on the war."

Senator Treed shook his head. "I try to be level headed and as honest as I can," he said. "But how many mousetraps have you had in the place since Pearl Harbor?"

"Not many," admitted the clerk.

"Freedom from rodent pests is a warfare that must be constantly and ruthlessly waged," replied the senator. "Otherwise, they overwhelm us. We stopped fighting rats to fight another kind. We licked the other kind, but there's this kind still. Now, what's new in mousetraps?"

"Here's a new number. It's called the Better Mousetrap. A new company started about a week ago and we accepted one on consignment."

"How much is it?" asked the senator.

"It's not for sale."

The senator spluttered in confusion.

"It's on a rental basis," said the clerk. "There's a register below. It counts the catch. You pay two two cents per catch."

"Really a guaranteed job, hey?" smiled the senator. "How does it work?"

The clerk held up the trap. "This is where you put the bait," he said. "You impale it on this spike and then swivel it through the slit in the wire so the mice must enter the tunnel to get to it."

"Yeah, but there's nothing there to stop the mice from having a free lunch," objected the senator.

The clerk took a small bolt set it on the floor of the tunnel, tilted the cage and let the bolt run down the floor slowly. It passed through the circlet and disappeared.

"Hey!"

The clerk grinned. "Convenient, isn't it? No muss, no fuss, no strain, no pain. And no corpse to clean away."

"A very definite advantage," said the senator. "But where do they go?"

"No one knows. They go—and we ask no questions."

"Make a fine garbage disposal unit," suggested the senator.

"Could be. I imagine so. Also a swell way to get rid of old razor blades. But every item that goes through this trap is registered—and that bolt will cost the firm two cents. It can't tell the difference between a bolt and a mouse."

"Hm-m-m. Good thing that tunnel is long and small. People would be poking all manner of things into them. But where do they go?"

"They're trying to find out. So far they don't know. It's said that one of the founders of the Better Mousetrap Company dropped a tag through with name and address and the offer of a reward. It hasn't been returned. Maybe the mail is irregular from Mars, huh?"

"Mars?"

The clerk shrugged. "I wouldn't know where," he said doubtfully.

The senator nodded. "Despite the population of the country—of the world—there are places where

men seldom go," he said. "That tag may be lying in the rough at Bonnie Dundee Golf Course for all we know."

Miss Agatha Merrit placed her pince-nez firmly on her nose. "Good morning, class," she said primly and with perfect diction.

"Good morning, teacher," responded forty third-grade voices.

Miss Agatha Merrit went to her desk and sat down. "Today," she said, "we will learn about being afraid. It is known that ninety percent of all things that people fear will not harm them. I know of big strong men afraid of insects and many women are dreadfully frightened of mice."

Peter Manton, Junior, raised his hand and said: "My father built a Better Mousetrap," he announced irrelevantly.

Miss Agatha Merrit was annoyed at the sidetracking, but young Manton's father was becoming a financial force in the community and she felt it unwise to ignore the comment. "I understand that the world is starting to beat a path to your door," she said, completing the old platitude. "But we're speaking of fear, not mice."

"You're not afraid of mice?" insisted young Peter.

"I can't say that I like them," said Miss Agatha Merrit. "Though I feel that the mouse is more frightened of me than I could possibly be of it. After all, I am quite a bit larger and more capable than a mouse—"

Miss Agatha Merrit opened the drawer of her desk but was prevented from looking in.

The next several minutes are not describable. Not in any sort of chronological order because everything happened at once. Miss Agatha Merrit headed for the chandelier and got as far as the top of her chair which somehow arrived on the top of the table. Mice boiled out of the desk drawer and spread in a wave across the desk and across the floor. In a ragged wave front, the third-grade girls found the tops of their desks and the third-grade boys yelped in amusement and started to corral the mice. By the time the room was cleaned up an hour later, the boys had thirty-four mice in a wastebasket covered by a small drawing board, four mice had escaped down holes in the woodwork, seven had gone out under the door, and three were trying to find their way out of nine-year-old pockets.

Miss Agatha Merrit never did learn the name of the ringleader of that prank. She strongly suspected Peter Junior who was at best an imaginative child with a clever mind and few inhibitions. What bothered her most was that the trick was repeated.

There were three drawers in her desk. Young Peter Manton brought, on the following morning, one of his father's Better Mousetraps. She placed it in the drawer that had been "salted" with mice the day before, but the pranksters used the second drawer that night. Carefully she concealed the trap in the third drawer on the following night, and the mice turned up in the top drawer again.

It became a race. Whether the problem would be solved before Miss Agatha Merrit became a quivering nervous wreck.

A total of one hundred and seventy-three mice registered on the Better Mousetrap in a week, and then Miss Agatha Merrit polished off the job by procuring enough traps for all of the desk drawers. Since no place remained to place them without the mice being collected and destroyed, the mice-filled drawers ceased to be a favorite prank of the school. The children, all of them sweet innocents, took to other forms of childish torture.

She confessed to Peter Manton,

Senior, that had it not been for his excellent product, she would be a nervous wreck. "And," she said, "I never did find out where they came from."

He grinned. "We've never found out where they went," he told her.

"I shudder," said Miss Agatha Merrit, "to think. Do you suppose, Mr. Manton, that your device transmits them to some other corner of the world?"

"We have tried to find out. Mice, unfortunately do not take well to being tagged. But we've tagged a number of them in the hope that we will discover where they go."

"I've noticed in the papers," replied Miss Agatha Merrit, "that there is a veritable plague of rats. The Chicago *World* had an editorial about you . . . did you see it?"

"No," he admitted. "But I'm rather pleased. What did they say?"

"It seems that the Chicago *World* was plagued with rats until they got about two dozen of your Better Mousetraps. That fixed them. Now they claim that your invention came along at the proper time. The world is about to beat its path to your door, Mr. Manton."

Peter shrugged. "Most inventions are made to fill a definite need," he said. "Discoveries are made because of man's curiosity. An invention is an aggregation of discoveries collected because their principles add up to the proper effect to take care of the necessity. I'm glad that I was able to make this invention of mine. It seems timely."

Senator Treed rapped for attention and the committee came to order. "This morning," said Treed, "we will have open discussion of the problem."

General Hayes nodded and said: "This much is known: The mice are delivered somewhere out of Manton's Better Mousetrap. I wonder if some foreign power might not have discovered even more of its powers and is using it to plague America?"

"That seems far fetched."

"Not at all. It might be likened to a bacterial warfare. Pests will vitiate a country as well as war—weakening a strong country to prepare it for easy conquest."

Tag Harris of the FBI Laboratory shook his head. "There's more than meets the eye," he said. "I've definite proof that some human agency is working at it."

"You have?" demanded Senator Treed. "Tell us."

"We tagged rats and sent 'em through one of Manton's traps. Later we used one of the old wire-cage affairs. Someone had gone to the trouble of counterfeiting some of our tags. Out of fifty-seven rats caught with tags, we found a duplicate number. Someone obviously caught a tagged one from wherever it was sent, and in an affort to confuse us, made duplicate tags and sent 'em back."

"Deliberate!"

Admiral Grayson of Intelligence nodded. "Tomlinson of Psychological Warfare says that's what he would recommend to spread confusion. You see, this Power would

not stop; they would also know that we are trying to find out all about it. Therefore they would prefer to add confusion to our search. Hence the duplication of tags."

"Could you tell the real one?"

Harris nodded. "Easily. The original one was well worn because the rat had more time to go roaming. The duplicate was almost new."

"They never did turn up with that key tag of Andrews, did they?"

"Nope."

"No one but a suspicious Power would conceal such a thing now that the search for it is out. The answer is obvious."

Treed nodded in agreement. "I shall recommend that Congress offer an award of twenty thousand dollars to whomever gives information to bring the truth to light." He shuddered. "This rat business is terrible. My wife is nearly out of her mind. Last night she swore that she saw a rat *appear* on the floor beneath the dresser. I hushed it, of course, but that is why I'm bringing this committee to order on the subject."

"Perhaps Manton's device just hurls them back and forth across the country."

Treed shook his head. "Manton's Better Mousetrap doesn't work that way," he said with conviction. "Thanks to Manton's little registers we know that Manton's catch—overall—has been rising but definitely following the increase in rat population over the entire country. You see, gentlemen, Manton's traps have been made to fill a demand in every case. It started with friends who needed them. You're sort of insisting that Manton's traps come assembled with its own mice."

That got a big laugh.

"And," said Senator Treed, "God help the one who is responsible for this!"

Tony Andrews entered the salesroom and smiled at the clerk. "Look," he said, "I've been a good customer."

"You have," agreed the salesman. "I know you. I'm Tom Locke."

"Well, Mr. Locke, I'd like another one of those key tags."

The salesman nodded. "Those things are popular," he said. "But what happened?"

"I dropped mine through one of those Better Mousetraps."

"Oh," laughed the salesman, "they've been returned from every portion of the globe. But I guess the mail service isn't too good from wherever That is."

"I'd hoped it would come back," said Andrews. "But I'm wrong. And I'd like another one."

"Sure. Be glad to. Since you're the man who originated the idea with us."

"I'm sorry to have to ask—What? Originated what?"

"Why yes. The tale goes that you came in to buy a car quite some time ago, and the salesman saw the tag on your key ring. He mentioned it to Mr. Cagley who is our advertising manager. He had the tags made up and we gave them out to our best customers."

"Then you've got me mixed up with someone else. For I received

mine as they did. Mine came in the mail and cost me three cents—which was as good an advertising stunt as the tags themse—"

"Mail? Mail? We gave them in person."

"But mine came through the mail."

"Sorry. We've never sent any of them through the mail."

"Oh," said Andrews with rising suspicion. He took the new tag with thanks and returned to Peter Manton's home.

"Peter, is Junior handy?"

Manton nodded and called. Junior came. Then Andrews said: "Junior, have you ever seen anything like this before?"

Junior nodded. "Last winter. Found it down in the cellar on my sled."

"Sled!"

"Uh-huh. Then because it said to drop it in the mail box if found, I did. You got it, huh?"

Andrews nodded. "Yup," he said. "I got it! Peter Manton, you haven't seen the end of this, yet."

Manton frowned slightly. "Why?" he asked.

"You've really built the Better Mousetrap, and you haven't seen the people who are going to beat their path to your door. They haven't really arrived yet. But they will!"

The first to arrive was the FBI. Then Peter Manton's domicile was changed from a town in Illinois to a cold stone place in Washington.

Ted Harris faced the Court. "Here is the originator of the Plague of Rats," he said. "And the saviour of the country at the same time. He is in the position of a physician who poisons people so that he can save them. A sort of stinking benefactor."

"Will you please explain to the Court?" demanded the Court.

"The field set up by the Better Mousetrap at the plane of cleavage hurls anything that passes through it *backwards in time*. The time-rate is indefinite and uncontrollable. However, this is why Manton's trap was so effective. On Monday a plague of mice appears in an apartment. The master of the place goes out and rents one of the Better Mousetraps. He places it in his apartment and during the time it is there it hurls mice backward in time to create the plague! Naturally, the trap will be removed as soon as the mice stop—and because the trap will be removed in a few days, the trap itself stops the flow of mice."

"But how far back—?"

"There's little correlation. It just hurls. It is aimless and uncontrollable. In one case, a key tag went back several months."

"But how come nothing was known of this?" demanded the Court.

Tag Harris smiled. "When I have something that will utterly destroy something, I do not place anything valuable near it," he said. In Manton's own laboratory the boys dropped spare parts through it. In

hardware stores all over the country the clerks were dropping screws and nuts and the like. Most of this stuff fell to the floor and was swept up a few days to a week before."

Tag Harris held up a scrap of newspaper. The date was four days in the future.

"Proof," he said. "I'll be sending that to myself later."

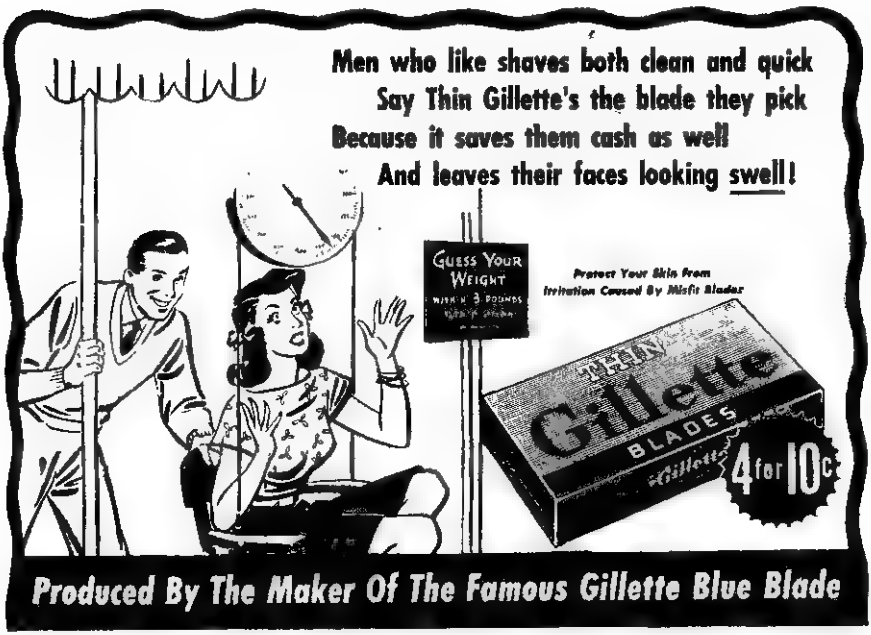
"And the tagged mice—the duplications?"

"Animals that had gone through the time-trap twice and were living their lives in parallel. You see, your honor, not only did Manton's Better Mousetrap hurl mice back in time, but it could hurl the same mouse back to the same era several times—and the Plague of Rats was a Man-Made Plague."

Epilogue—

'Tis said that he who laughs last laughs best. The world who beat a path to Peter Manton's door in anger because he built the Better Mousetrap, returned to thank him anyway. You see, with mice being hurled backwards in time, they lived and they died in the mad rat-race in time. And America, for its trouble with more rodents than it could stand for a short period, now reaps its reward. For America is free of rats.

THE END.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INSOMNIA, INC.

If men didn't have to sleep, it would give researchers a big help in meeting a deadline. No doubt about it. But there is some doubt, still, in another respect—

BY HARRY WALTON

Illustrated by Pat Davis

At least, Sanders thought irritably, the man might have stayed awake until the story was told. Instead, Wirtberg sat like a log in the one comfortable chair the tiny office boasted, fat hands clasped over his enormous paunch, heavy-lidded eyes shut, his thick underlip trembling with each exhaled breath. He seemed on the verge of snoring. Sanders bit his lip in annoyance. A fine thing for Pioneer Spaceways to be asking help of this mound of blubber!

Suddenly Wirtberg sighed gustily. As though the effort was to be his last, he opened his eyes. They were pale blue and inordinately small in that vast face.

"That is all?" he wheezed.

"It's enough. Cullen has three times the men I have. It stands to reason he can do research, experiment, and demonstrate a perfected drive before we can. The first patent is bound to be basic. We'd be sunk."

"So it seems to me also, my young friend."

Sanders snorted. "I'm not asking you to confirm that. I'm asking you for help. Five years ago you were working on the elimination of sleep. We're desperate enough to

think something like that might give us a break."

Wirtberg smoothed his enormous vest, fished a package of gum out of a pocket, and unwrapped it with lazy care.

"You think, if you can all work more and sleep less, you can maybe still beat Cullen?" He shook his head. The gum disappeared, and three chins wagged rhythmically.

"It might give us a fighting chance."

"Fighting. Always you young men must struggle. Look at me. Do I fight? No, because I cannot afford to. I, Emmanuel Wirtberg, confess it. My tissues are degenerate. My heart is overburdened. Any day may be my last. So I, I fight only with the brain, and even that I do not overtax."

Sanders brushed red hair back from his forehead impatiently. "Sure, but with us it's fight or bust. I've got one ship out on the Callisto run, and it's mortgaged to the hilt. It's only because we run on shoestring profits that we can compete with Cullen's two ships—that and the fact that rocket drive costs him as much as it does us."

He hitched his squeaky swivel chair closer to the other man in his earnestness. "Look, it goes deeper than that. You knew my father. He reached Callisto first, and so far as the Callistans are concerned he represents the whole human race. He made the trading terms and they were fair ones. How long do you think they'd stay that way if Cullen's ships were the only ones to call? And if he perfects a repulsor drive before we do, they will be, because rocket power won't be able to compete. We know he's been working since the repulsor principle was published for development three months ago."

Wirtberg's pale eyes grew mournful. "I have nothing that could be of use to you. And if I had, you could not pay me. Is it not so?"

"It's so. We've sunk all our cash and most of our credit into research. But I thought you might string along with us. There'll be plenty of royalties from other lines if we design a basic drive."

The pale eyes closed against the creases of fat cheeks. "It is too bad. I never gamble. Always, with me, it is paramount that I be paid. So it is as well that I cannot help."

"Sure," said Sanders bitterly. "Just as well. Sorry I bothered you." He was, too. He hadn't slept in twenty hours, and the interview had blasted another hope, and he was furious with himself for expecting anything at all from Wirtberg, for presuming even so far on the man's ancient friendship with his father.

Wirtberg opened his eyes again. "You see how it is? I am a sick man. To gamble is for me not business. I do not live to work. I work only to live, so I must be paid."

"Of course. Sorry to have asked you."

"You are bitter, my young friend," murmured the big man. Sighing gustily, he heaved his bulk out of the groaning chair and

waddled toward the door. On the threshold he paused.

"A thought for you, my friend. If you are afraid of Cullen, do not forget that he also is afraid of you. Nor that the race, it is not always to the swift."

The fat man didn't stir when the receptionist called the first time.

"Mr. Cullen will see you now," she repeated.

"Of course he will. Why should he not? He is curious. He says to himself, 'What can the eminent biochemist, Emmanuel Wirtberg, want of me? If it is a donation, I can always refuse. But first I must find out.' So he agrees to see me."

"Yes, sir. Will you go in?"

Grunting, Wirtberg struggled to his feet and walked past the girl. The door she indicated opened as his bulk occulted an electric eye. Once through it, he headed straight for the largest of two chairs beside an impressive desk, and only when solidly implanted in it did he look at the man behind the desk.

"You will excuse an old man his liberties, Mr. Cullen? My tissues, they are degenerate. My heart is overtaxed. It is necessary that I pamper myself physically, but my brain, it never rests."

The other nodded curtly. Thin, nervous lips gnawed at the fringe of a mustache waxed to two tiny points. Cyrus Cullen surveyed his visitor with eyes that popped absurdly out of a thin face. He said nothing.

"You wonder why I am here," Wirtberg continued. "I will tell you that I have just come from Thomas Sanders."

"In that case," said Cullen in a high-pitched, querulous voice, "we are probably both wasting our time."

Wirtberg gave no sign of having heard. "He makes progress, this young man. He possesses boundless energy. His spirit is superb. But he has no money—we cannot transact business, you understand. In this world, one must sell if one would buy."

"Of what interest is this to me?" demanded Cullen.

Wirtberg carefully unwrapped a package of gum. "I say to myself, 'If this that Thomas Sanders wants is important to him—a pity he cannot pay for it—then it must be valuable to Cyrus Cullen. And surely he will be able to pay for it.'"

"What've you got that I'd want?" snapped Cullen.

"Time," said Wirtberg, and bit into the gum.

He chewed slowly. Cullen toyed with a paperweight, his mustache twitching. "Go on," he urged at last. "I'm listening."

"So. Money you have. Technicians you have. The drive principle, it was published for development and so is anybody's until a practical drive is demonstrated. But one thing you need that you cannot buy—time. Of that Sanders has as much as you, not a minute more, but also not a second less. Your men work, then they must rest, then they work again."

"You're not telling me anything new," growled Cullen.

"But I have said it! Your men, they sleep because they must. But what if they did not sleep?"

"Fine," growled Cullen. "It would also help if they didn't eat, quarrel, or want to visit their wives. So what?"

"So we cannot help the eating; and the quarreling, it is for the psychologists to prevent; and women even have their place. But sleep, it is not necessary. I, Emmanuel Wirtberg, can arrange that."

Cullen glared at him suspiciously as he lit a cigar.

"Assuming it's possible, what are the drawbacks? What strings are attached to this thing?"

"But none! The health, it remains excellent. There are no ill effects. The psychology, that is something else. It is not a freedom for little minds. I would treat only men certified normal. For abnormal psychologies I would not be responsible. That must be agreed."

"What about mental alertness? Memory? Reasoning faculties?"

"Better than ever. This also I will guarantee. The brain, it becomes like mine, of a brilliance extraordinary."

Cullen paced to the window, paused, and strode back.

"You've tested this thoroughly? On humans?"

"First on animals, with a success astounding. And on one man, but his identity I cannot reveal. You have the word of Emmanuel Wirtberg."

"Your price for treating seven men?"

"One hundred thousand points."

"Ridiculous," snarled Cullen.

Wirtberg sighed deeply. "So I say to myself. How can even I, although of a genius extraordinary, put a price on this so precious commodity, time? But one must live. So for a price I sell what is without price.

"Fifty thousand!"

Wirtberg folded his hands. Eyes closed, he sat like a stone Buddha.

"Seventy-five," snarled the thin man.

The figure in the chair gave no sign.

"A hundred thousand, provided I get the patent."

Wirtberg's eyes opened. He sighed again. "We do not meet with our minds, Mr. Cullen. A pity, is it not? But I never gamble."

"All right!" snarled Cullen. "A hundred thousand in advance, refundable if you fail. I'll want your guarantees in writing. You're to renew the treatment as often as necessary at no additional cost."

"Most certainly. But these men of yours I do not know. Are they of normal psychology? Of that I must be sure. A ten-day psychodiagnosis will be sufficient."

"Ten days!" roared Cullen. "That's out. Time's the whole essence of this thing. You know that."

Wirtberg shrugged broadly. "Regrettable, is it not? But how else shall I dare undertake the responsibility?"

"O.K., I'll waive it. Psycho-

logically they're none of your business. But you guarantee their physical welfare."

"That is so. You may draw up the agreement." Wirtberg sighed deeply as he struggled to his feet. "I am an old man. Travel, it fatigues me. You will come to my laboratory for treatment tonight? The injections, they are necessary over a period of four hours."

"We'll be there."

"At twenty o'clock precisely, if you please. It is vital to me that I do not exert myself late at night. You understand that a sick man must pamper himself. My heart is of an abominable weakness. My tissues—"

"We'll be on time. Any special instructions?"

"To be sure. Do not by any means fail to bring with you the hundred thousand points—in cash."

Sanders, deftly parking his well-worn roadster beside a tin-roofed shanty, looked up automatically as a rocket take-off burst roared out over the field. The departing ship was far off, at the south end, and already had dwindled to an absurd size under its tremendous acceleration. He watched the pale blue flame of its exhaust lose itself against the somber evening sky, then glanced back to the glare of loading floodlights a quarter of a mile down the landing strip.

That would be a Cullen ship, he knew. Only the Callistan vessels and a few Venusian tramps used this port now. Once the land had been swamp. Eighty years ago it had been reclaimed for a world's fair. It was close to New York, but not fashionable; the luxury Luna ships and most Inner Planet liners landed at La Guardia. Its chief advantage was that the ground fees were low.

But not low enough to keep Pioneer Spaceways in business if Cullen beat them to the drive. Strange how it boiled down to a race between him and Cullen, both comparatively small operators. Other lines, with shorter runs, could afford rocket fuels. If a repulsor drive were developed they'd switch to it in time, but it wasn't the life-and-death matter to them that it was to the Callistan lines. So far as he knew no other group was even interested enough to research the problem now. Shipping was on a boom and they had their hands full coining profits.

He turned away from the floodlights and only then saw Tony, her slim sweatered figure limned against the glow from inside the lab building. She'd seen him. But it was like her not to call him, not to draw attention to herself until he was ready to give it. He wondered briefly whether he would ever meet another as thoroughly satisfactory a woman as Antoinette Brandes. The question was purely academic; he didn't want to.

"We're ready, Tom," she said. "Ed held the test up for you. Did you rest well?"

"I feel wonderful." He kissed her as though he did. "Now let's see what you two have worked out while I was on the shelf."

The laboratory was small, cramped, full of dark corners to which the fluorescents never penetrated. An ionic converter hummed furiously at one end, but the lighting was concentrated over a single long workbench. Over this bent a huge, youngish man with a receding hairline and bifocal glasses. He straightened as the others entered, and his homely features were lighted by a wry grin.

"You're in time for the debacle," he announced. "Tony says it's another flop. She's had her slide rule out too often. All set?"

Sanders felt his scalp tingle as always when one of the innumerable tests was at hand. He'd never been able to take the thing as Craig and Tony did. He simply nodded. Tony calmly closed half a dozen relays on the panel board. Craig watched her approvingly, nodded, and pressed a contact home.

On the bench a misshapen mass of metal and plastic the size of a football came to life as the cables feeding it hummed with power. Needles moved over a dozen dials. And almost immediately a pungent smell of ozone manifested itself. Seconds later it was suddenly tainted with that of burning insulation.

"Cut!" said Craig, and the needles dropped back as power died out of the cables, out of the ungainly thing on the bench. "What thrust?"

"Six point four seven. Run twelve seconds, four more than last time."

"We're making progress," said Sanders bitterly. "Twelve seconds continuous run after twelve weeks of work. Just half the thrust we need to lift a pay load. Looks as if rockets have a big future."

"But it was predictable, Tom," said Tony. "Just as in every other test we've run, there was that one factor that wouldn't check. It never has. Of course I'm completely stupid about the engineering factors you have to deal with, but I am sure about my figures."

"She means our dielectric constant," Craig put in. "And don't swallow that about her being stupid. She makes with the equations like Einstein. And, confound it, she's always right."

"We might try plastoene plates in the capacitor," said Sanders. "And how about inverting the phase of two drive circuits? That'll cut the load even while the capacitor's doing the same job. Here, let's work out the new constants for Tony and—"

"Mail has been received," announced an automatic speaker.

The two men might as well not have heard it. Tony slipped from the laboratory, went to the tiny office, and opened the mail-tube receptacle. She did not tear open the sealed form it contained, but her walk back to the lab was very slow."

"We'll start with a thousand mils on the repulsor grid. Try that on your slide rule, Tony. Make the capacitance—"

Sanders saw her face then. She simply held out the letter, and he looked at the return address and tore off the tape without a word.

Reading it at a glance, he passed it to Craig.

"That's our notice that Cullen has filed for demonstration. Our swan song. Finish. "The strain of weeks, of mental and physical fatigue, increased disappointment to the point of bitterness.

Craig's reaction, too, was tinged with weariness, despite an obvious effort to face the situation. "Maybe he's bluffing. Or he may be overreaching himself, banking on a research schedule he can't meet. If he can't produce a model on the date he's filed, he can't apply again for sixty days. Meanwhile we may lick those flashovers—"

"Or we may not!" Sanders answered harshly. "I won't let you and Tony kid yourselves for my sake. We may as well admit we're licked. Cullen's too smart to go off half cocked. Since he's filed, he's sure to have a model. And even if we had one with which to contest his application, and it was as good as his, the best we could get now is a shared patent."

The logic was unanswerable. There was no dissenting voice as he tossed the circuit diagrams into a filing bin. Craig and Tony looked helplessly at each other as he left the laboratory.

Sanders had in mind nothing more but to be alone, to thrash out what he recognized as fatigue-induced discouragement. Without conscious decision he headed for the little office. He had reached his desk before he became aware that somebody else was in the room. An apology came to his lips, to be stifled as he saw who it was.

"Your receptor panel said 'enter', so I did," said Cyrus Cullen.

"We're careless that way," Sanders responded. "But then, most of our visitors are nice people."

Cullen ignored the thrust. "Working hard?"

"You know we are. And you didn't come to ask, so say your piece and be done."

Cullen shrugged. "You probably know by now that I've filed for demonstration. Or else you soon will. You're licked, Sanders."

"Too bad I can't take your word for that."

"It would pay you. You're beaten and we both know it, but I'll admit that by some fluke you might produce a contesting model and claim a shared patent. That's barely possible, but I can pay to eliminate a long shot. I'll give you fifty thousand for your drive as it stands."

"The Pioneer drive isn't for sale."

Cullen grinned. "Maybe I can help you change your mind. You don't yet know what you're up against. How much sleep have you had this week?"

The question was so unexpected Sanders answered it before he thought. "Twelve or thirteen hours. O.K., so we're understaffed and overworked. But we'll keep trying to beat that brain trust of yours."

He was nonetheless acutely conscious of the contrast between himself—heavy eyed for want of sleep, seedy in clothes he'd worn too long

—and the alert, dapper figure presented by Cullen.

"Yes, take a good look at me while you're at it, Sanders. I feel fine. But *I* haven't slept one minute *in the last eight days.*"

Stunned nerves absorbed the shock slowly.

"You didn't . . . oh, no, he wouldn't have —"

"If you mean Wirtberg, he did. You couldn't pay him, so he made a deal with me. My technicians all got the antifatigue treatment, too. When it wears off, they'll get it again. They can work twenty-four hours a day if need be. They're in top physical shape and their minds are, if anything, keener than usual. You're up against an unbeatable combination, Sanders. I'm generous to offer you fifty thousand."

"No sale."

"You're tired!" sneered Cullen. "If you weren't, you'd know when you're licked. My demonstration date was figured before we got the antisleep treatment; I bought Wirtberg's help just as a matter of insurance. There isn't anything — not a single, small, solitary thing — that can keep me from demonstrating my model on the date set. I'm offering you fifty thousand just as another insurance premium— against a million-to-one shot. Want it?"

"Get out of here," said Sanders thickly, getting to his feet.

Cullen stood up, too. "It won't pay you to be stubborn. Think it over, but not too long. Tomorrow my offer will be forty-five thousand. It'll drop five thousand a day."

"Get out!" gritted Sanders.

Cullen's smirk stuck in his memory long after the man had gone. But finally Sanders strolled back to the lab, where Craig and Tony at once pretended furiously they were not interested in the sheets of figures before them.

"Cullen was just here," Sanders announced. "He offered fifty thousand for our drive."

The others' silence was pregnant with question.

"Maybe I shouldn't have done what I did. Maybe I owe you both all kinds of apologies. There just didn't seem to be anything else—"

Craig's answer came haltingly. "We're sorry too, Tom. But if you saw it that way, it's all right with me. And with Tony too, I'll bet. We'd have stuck if you wanted to keep on, but . . . but that's all, I guess."

"That's right," Tony added. "Whatever you say, Tom. Sometimes you have to be smart to know when to quit."

"I guess none of us are, then," said Sanders triumphantly. "I turned Cullen down cold, even after he admitted Wirtberg sold out to him. Get out that slide rule again, Tony."

Alex Henderson, treasurer of the Cullen line, watched his employer pace the floor in his office with a nervous energy just short of being ridiculous. The popeyed little promoter seemed tense to the bursting point.

"Jupiter's sake, sit down," burst out Henderson at last. "It makes me tired just to watch you."

Cullen, back at his desk in three strides, flung himself dynamically into his chair.

"That's a sample," he barked, "of the co-operation I get. It makes *you* tired. Doesn't anybody care what's happening to my organization?"

"Of course. You're two weeks ahead of schedule, your application is filed, Sanders is beaten, and your ships are making a profit on every run. Is that bad?"

"But Sanders is still working, two weeks after I offered to buy him out. He has something up his sleeve."

"Nothing but elbow grease," retorted Henderson. "Your imagination's got you by the throat. Remember that the best he could get—by crowding his luck to the limit—is a shared patent. Which means you'd both stay on the Callistan run, making more money than ever before."

"That's what he's after! And what are we doing about it?"

Henderson, who hadn't had the antisleep treatment, yawned.

"What you need is a good night's sleep," he offered. "This Wirtberg may be able to keep you awake, but you've been sharp as cracked glass all week. The other fellows at least get out of their labs regularly. They don't brood as you do. And at that I don't like what Gilroy said this morning."

"What?"

"That it's dull throwing loaded gloves against a man who has a glass jaw. And that he wished he could change sides, work for Sanders a while, to even things up a bit."

"You see? See what I'm up against?" Cullen's voice neared a squeak. "No loyalty."

"What I'd say is that they're bored. And you, too. You've been in this thing too long. Even while you're wrapped up in it, you're sick of the whole affair yourself."

Cullen snorted. The announcer on his desk glowed, and he barked an answer. A man in a laboratory technician's smock entered.

"Well, what do you want, Moran? A bonus on your bonus?"

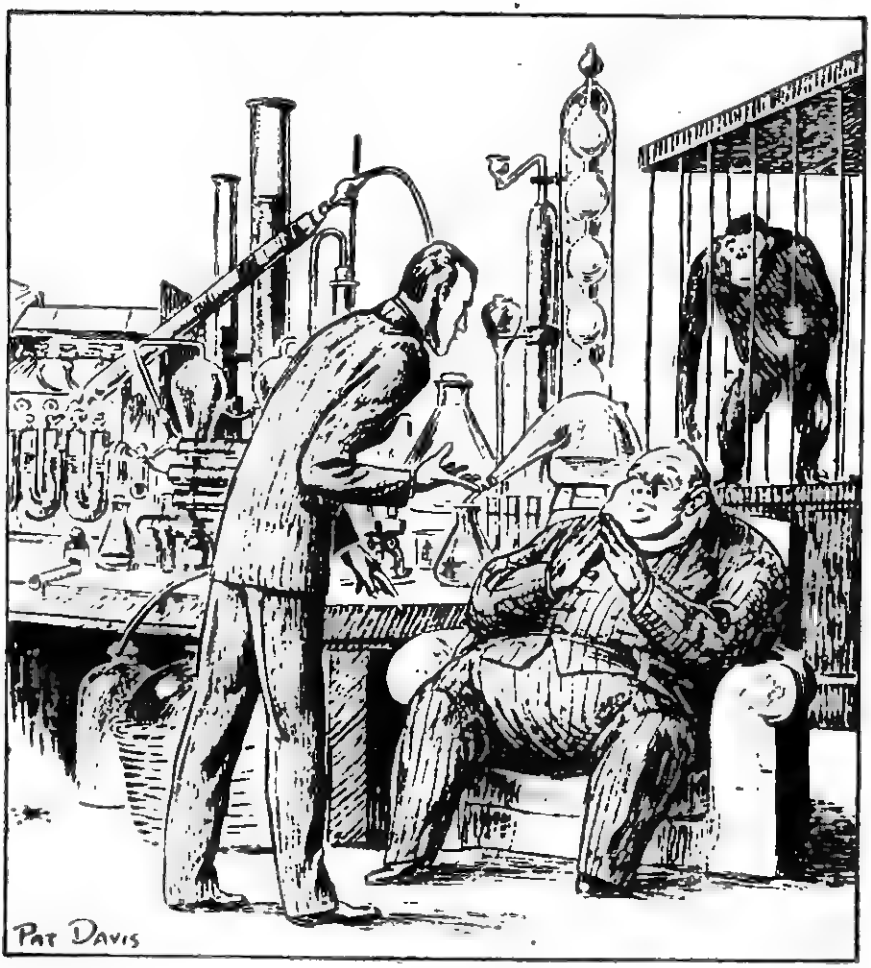
The man stood jauntily without saying a word, but very slowly a smile grew, overspread his face. He beamed on the mustached little man behind the desk.

"Speak up! Don't stand grinning like an idiot."

The man continued to smile. Without budging, Cullen managed to give the impression of hopping up and down.

"Then get out. If you have nothing to say, get out!"

"But I have." Moran found his voice. "I came to remind you that I've worked for you eleven years, at bottom pay for ten of them. Ten months ago you trebled my salary. I'm in line for a good bonus when your patent goes through. I helped you get it, and that's all right. I just want to say we're even and I'm quitting."



"You can't!" Cullen screamed. "You'll get no bonus if you do."

"I know it. That's why I'm tickled. You see, I don't care. I just realized I'm free. The job's done and I'm sick of it and I'm going. I just realized the bonus doesn't matter. I'm so sick of it no bonus could make it worth my while to stay."

"I'll double it. You get twice what the others do."

Moran shook his head.

"You don't see it. I'm bored. I have been for ten years, and never knew that was what was wrong with me. Now I know and I'm doing something about it. Going to tour the world. Always did want to."

Without another word he turned and walked out, amid a torrent of words. When finally exhausted of speech, Cullen opened a desk drawer, swallowed a pill from a bottle there, and washed it down with a drink. Henderson watched, half amused.

"I said you were bored. He said he was. A tough customer, boredom. You can't fight it, can't come to grips with it. Maybe it's going to beat you after all, Cyrus."

Cullen gagged over his drink, so that Henderson had to answer the announcer for him.

"It's Craven this time," the treasurer reported. "May as well see him and get it over with. Maybe he wants to quit, too."

"Not Craven," Cullen snarled when he could talk again. "You know he can't walk out on me."

Craven, dark and sardonic, stood as jauntily before the desk as Moran had. Silence held for forty seconds, a duel between him and Cullen.

"Spit it out!" roared Henderson, as the suspense grew.

Craven laughed. "All right. I'm fed up. You don't need me, and I'm not going back. It's routine from here in."

Cullen's face purpled. "If you leave here, it'll be to go to a Lunar jail. I've got what it takes to put you there."

"Save it!" Craven stuck his long face into the other's. "You've held that over me six years. And only now I've found the nerve to tell you to go to Pluto. Know why? Because I'm bored stiff. Even a Lunar prison would be a change. I won't go back to that lab."

"Why not?" asked Henderson reasonably. "It's a good lab. You get paid well. You'll get a whacking big bonus. Why not go back?"

"Bored stiff."

"You'll like Luna," Cullen snarled. "Two weeks of night, two weeks of day. Prison routine, clock controlled. Always the same."

"Hold it," Henderson interrupted. "If both of you weren't overwrought, you'd see where it fits."

At truce for a moment, they looked at him.

"Craven wants to quit the lab. All right. You, Cyrus, are worried about what Sanders is doing. I think you're foolish. But Craven could prove you are."

"You mean let him spy on Sanders?"

"Let him play investigator. I believe he's not without previous experience that way."

"I can walk without stamping my feet," Craven admitted. "Never mind the cracks. For that I'm your man. I'll want the lab bonus plus that story about me you keep in your safe."

Henderson got up, yawning.

"You two will get along. I can leave the dirty details to you. For myself, I'm glad I can still enjoy eight hours of sound sleep. Good night."

He left the others in sullen but complete agreement.

Sanders stirred on his cot in a cubby adjoining the office. Through

a haze of delightful languor consciousness struggled back to a sense of his whereabouts, to a sharp, chronic realization of the problem that claimed his every waking moment. Reluctantly he raised his head to glance at the luminous clock on the wall. It was only 3:15. He had allowed himself until five. Only as he turned back to his pillow did the disquieting truth penetrate his sleep-starved brain. *Something* must have awakened him. It wasn't in nature that he would have stirred otherwise.

That realization stung him awake as no physical impetus could. He got up, threw the master switch that turned on lights throughout the lab and the adjoining shop. The illumination stabbed his eyes agonizingly; almost without sight he groped through the harsh brilliance, his feet through long habit taking him to the lab. There he flung the door open, stood blinking as his pupils strove to accommodate themselves to the glare. Something in the air made him cough. On the workbench the black bulk of the drive unit seemed to shimmer before his gaze.

Then, with stunning suddenness, he knew that not his eyesight but the object itself was the cause. The drive was activated, had been for some time, and was already overheated to a point where insulation was breaking down.

In what seemed long moments but could have been no more than a second or two he reached the power switches and opened them. A stench of overloaded dielectric plates hung like a pall over the workbench. Seizing tools, he loosened the housing bolts, flung the hot metal aside heedless of burned fingers, and stared at the wreckage within.

It was complete. Every tube, relay, and condenser bore the marks of damage, including special units designed by him and painfully handmade by Craig. A sledge could hardly have created greater havoc.

He was still at the workbench, disassembling the unit to salvage the pitifully few parts that might be made to serve again, when Tony and Craig found him.

"You have nothing to worry about," said Craven. "They're still fooling with steatite as the repulsor dielectric. We've been through all that and know it's a blind alley. And, of course, they're still putting high potential on the repulsor grid, which is hopeless."

Cullen chewed the end off a cigar; as an afterthought he pushed the box toward Craven.

"You got out unnoticed? They don't know anything?"

Craven grinned.

"Unless they're deaf, dumb, and blind, they know it wasn't Santa Claus who came last night. I tried their model out. It ought to make good scrap."

Cullen swore. "You're a fool. You've not only tipped them off to that we know what they're doing, but forced them to build a new model. Suppose they hit on the right combination in rebuilding?"

"I'm betting," said Craven neg-

ligently, "that they don't. Do I get paid?"

"Yes. I may need you again."

Craven threw his half-smoked cigar into the ash tray. "I want something else. A good night's sleep. I'm not one of your trained seals any more."

"You'll sleep when the rest of us do," snarled Cullen.

Craven got up. "That your last word?" And as Cullen only scowled in reply, he added: "Because it best not be. I don't know just what's wrong, but I'm not normal. I feel as if I don't give a whoop how things turn out, the way I felt when I played hookey from school as a kid. That's how I came to wreck Sanders'- model. It wasn't smart, and I knew it. But I didn't care."

At the door he turned back briefly.

"I think that goes for the whole bunch in the lab. Better let them sleep before they all start doing things just to see what happens. Because what happens may surprise everybody—especially you."

"A week's work," said Craig, his eyes serious behind their lenses.

"I should have heard him," muttered Sanders. "I *did* hear him, and just lay there, doing nothing."

"The sooner you two quit the post-mortem and get to work," said Tony practically, "the sooner we're back in business."

Craig grinned at her. "How can one girl be right so often? O.K., give me those plate dimensions again and I'll start."

Tony riffled her papers—and suddenly gave a little gasp of dismay

"He's been at these—look!"

The sheet she held was heavily smeared with pencil marks, interlined with scrawls.

"Even with the calculator, that's a day's work," she said indignantly. "And so senseless. Why didn't he just tear it up or burn—"

She fell silent, studying the sheet, while the men watched.

"He knew calculus," she mused. "Look—he substituted for this quantity. And it comes out right, if you follow through! Remember what never seemed the correct value?"

"The repulsor dielectric," Sanders admitted. "Is that it?"

She nodded, writing rapidly. "Here it is, within the theoretical limit we fixed on and were never able to reach."

"No good, then," said Craig. "A dielectric of that value would break down instantly."

"Let's see, all the same," suggested Sanders, taking up a book of synthetic-material specifications. "It's way below steatite, which we've been using. Here—a foam-body silicon compound, silcanite. You're right, it breaks down at 200 volts."

"And we're using 6,000," scoffed Craig.

Sanders laid the book down. "I don't get it, Tony, but even if it made sense—how could it? Why should the enemy give us information?"

"If it's the enemy," countered Tony, "why try to fool us with something that *seems* so wrong?"

"She's right again," Craig admitted reluctantly. "And it's funny how the constant he gives jibes with silcanite to the last decimal. All we need is to knock our 6,000 volts down to 200 or less."

"We can!" Sanders cut in. "The repulsor has to be biased at 6,000 with relation to ground. But across the plates themselves any reasonable difference would serve—175 would be ample. So we throw 5,825 volts on the second plate, 6,000 on the first. We're high to ground, but the dielectric is stressed to only 175 volts."

They loked at one another with renewed hope, the mantle of weariness dropping from them as though routed by sleep. Tony reached around and slipped a graph sheet into the calculator.

Cullen, guided by a grinning Japanese houseboy, stalked glowering into Wirtberg's biological laboratory. The master of the establishment sat in a huge chair before a worktable laden with chemical ware, but his eyes were tightly shut and his hands folded over his enormous stomach. Fluid bubbled unheeded in a retort before him.

"Wirtberg!" The dapper owner of the Cullen lines stopped in the doorway, appalled at the stench within. "Confound it, man, I had to see you. Why didn't you come when I asked you to?"

The biologist reluctantly opened his eyes. "Ah, it is Mr. Cullen. But I rarely go out. For me it is a great exertion to leave my house. My heart is already overburdened. My tissues are—"

"All right," said Cullen hastily. "So I've come to you. Can we go somewhere else? This place stinks."

"Does it not?" agreed Wirtberg calmly. "You should not have come."

Cullen glanced at him suspiciously, then with a shrug decided no insult was intended. He edged farther into the place. A cageful of monkeys at the far end set up a terrific chatter at the sight of a stranger.

Wirtberg waved to a stool near by. "Surely there is nothing wrong. Your men, they do not fall asleep over their work?"

"No, but it's serious enough," growled Cullen. "Try to understand this. Twenty-six days ago we'd reached a point where my engineers could promise a working model within a definite time. I know engineers; that estimate didn't allow for mistakes. But I filed for that date after you'd given us the antisleep treatment. Figured that gave us margin for anything those fools could overlook, since they could work day and night if something went wrong."

Wirtberg nodded ponderously. "But surely things are not wrong? Their minds are keen as ever? I, Emmanual Wirtberg, guaranteed it would be so."

"Oh, they're keen enough," confessed Cullen sourly. "That's the trouble. They're bored. Mind you, they're not overworked. We're right up to schedule. But my chief engineer asked me for a vacation

yesterday. A vacation! And this week two of my best men quit. Wouldn't say why except they were sick of the job."

The biologist made clucking noises. "But what can you want of me? These men, they tire of the work. They are in good health, their faculties are not impaired. It is not my fault."

A gaudy bird in a near-by cage suddenly squeaked madly. Cullen jumped, wiped his brow with a handkerchief.

"I didn't say it was. It's just boredom. They want a change."

Wirtberg made more clucking noises. "It is so much like the case of Elmer," he said judiciously.

"I'm not interested in family reminiscences. What about my men?"

"Elmer is a monkey," continued Wirtberg imperturbably. "The anti-sleep treatment, it was very successful with him. From the very first he did not sleep. Day and night he hopped about in his cage. But finally, this monkey he became bored. Then he became very unhappy. Even in a new cage it was the same, and not even a new friend, a monkey named Mary Jane, could long interest him. He would only sulk."

The biologist wagged his head solemnly.

"Afterwards only did it dawn on me. This Elmer, he was a victim of psychic fatigue. He was bored with his surroundings and with his body and most of all with himself. I shrug. I say, *'Pouf!* This is merely an animal. It has few interests. With men it will be different.' But alas, your men, they are also bored. 'Did I not say it is not a freedom for little minds? Did you not ask me, Emmanuel Wirtberg, to waive the psychodiagnosis I demanded?"

"O.K., so I did," admitted Cullen. "You've diagnosed the trouble. What's the cure?"

Wirtberg shrugged. "The cure, it is to sleep. In psychic fatigue, the patient desires to rest in his dream world. Nature, she gives us two worlds, one to strive in and one to rest in. It is not only the body that rests—no! The soul, it expands in the more elastic world of dreams. It is not unconsciousness it seeks, but rebirth in the realm of its own making. Even the fantastic dream, it is flight from the boredom of reality. The ego rests itself in fancy. Too much reality it cannot endure."

Cullen licked his lips. "That makes sense. I've felt I wouldn't mind a good night's sleep myself. Why not? If sleep will keep them on the job, we can afford it now. Take care of it, will you?"

"But gladly. I foresaw that you might desire the antidote to the treatment. I did not, of course, know you would want it so soon. But already I am working on it."

"Working on it?"

"Constantly, day and night. You see before you the extraction of an alkaloid intended to restimulate the sleep center of the brain." Deftly, for all his hamlike hands, Wirtberg swung aside a Bunsen burner to allow the retort to cool. "It may,"

he continued pleasantly, "be so much of a failure as all my other experiments."

A cold blue flush spread upward from Cullen's lean throat. His prominent Adam's apple bobbed violently before he found voice.

"You mean you haven't got an antidote yet?" he demanded shrilly.

"But no. Although it is yet too early to say there is none. I have after all made only two hundred seventy-four experiments so far. But I do not give up. I, Emmanuel Wirtberg, still believe there is an antidote. It remains only to find it."

"But you didn't tell me there was no antidote," squeaked Cullen. "You even agreed to renew the treatment when necessary."

"To be sure. I abide by the contract. If your men fall asleep, I gladly will repeat the treatment. But it has never proved necessary yet. Even Elmer, he is still awake after five years."

"Five years—" muttered Cullen weakly. "Wirtberg, you've got to find it." He swallowed as though gasping for breath. "My men . . . I wouldn't dare tell them this. You mustn't let them know. They'd kill me."

Carefully Wirtberg unwrapped a stick of gum. "It is possible, yes. The psyche denied its normal escape in dreams may turn to morbid violence. Particularly so if there is present a suitable scapegoat."

He eyed the trembling little promoter speculatively, then nodded, as though he had reached a satisfactory conclusion. "Yes, it is even more than possible. You are the logical victim. Me, I am safe. Is not Emmanuel Wirtberg the only man who knows the antisleep treatment? And who else can discover the antidote? But you—"

He shook his head gravely, his three chins chewing in unison.

"There must be a way out of this," whispered Cullen, dabbing at his moist forehead. "A quicker way. You alone here . . . hundreds of experiments! It may take a lifetime!"

"Already it has taken five years. But science, she is a demanding mistress. What is the life of a man?"

"No! This can't wait, Wirtberg. You've got to find it fast. Get assistants. Get a bigger laboratory. Run ten experiments at once. Twenty."

Wirtberg gestured with both hands, palms down. "My friend, I am a poor man. Such a schedule as that, it takes money. I would be happy to supervise it, but assistants, they do not work for nothing. A bigger laboratory? I can scarcely afford this one."

"How much?" The words were a whispered croak.

Wirtberg closed his eyes calculatingly; his chins ceased their labor of mastication.

"It is possible," he said at last. "Not easy, no. Only Emmanuel Wirtberg could work such a miracle of research for only two hundred thousand points."

Cullen made no sound. His face was the color of dirty wax.

"Yes," Wirtberg continued cheer-

fully. "Two hundred thousand will give us a start. And if I must afterward ask for more—"

He shrugged expansively, smiling at the crushed and silent wretch beside him.

Tony read aloud from the official-looking sheet brought by the morning mail.

"Since, in the event that both claimants are successful, a shared patent may have to be granted, their models must be alike as to size, shape, weight, and other outward characteristics. Plans and specifications for the hulls are therefore submitted herewith. Models must be remote controlled by microwave transmitters on the individual wavelengths specified below."

"Simple enough," was Sanders' comment. "The hulls are standard one-man lifeboats, which is just what our drive will handle, since, of course, there won't be a passenger aboard. The prime drive units and the maximum weight of the repulsor drive itself were set when we filed for development, so Cullen had to stick to the same limits we did. And we can adapt a regular microwave control unit in an hour or two. Of course Cullen will do the same, and except for the tuning our controls are bound to be almost identical."

Craig frowned. "Sounds fair enough, except that Cullen shouldn't ever have been able to claim against you. If Wirtberg hadn't double-crossed us, the sanctimonious old fraud—"

"Cullen would still be on our necks," Sanders finished. "With the men and money he had, he could hardly miss. No, this is a case where half a loaf will be mighty welcome. A shared patent means our ships stay on the Callisto run. But if Cullen wins full rights—"

"He won't," said Tony staunchly. "Our drive works wonderfully."

"And just to make sure it'll keep working," said Craig, "Tom and I are going to sleep here from now on. I've got a few interference beams rigged where they'll catch anybody who tries pussyfooting around while we're asleep."

"Which won't be much," amended Sanders grimly. "We're still up against Cullen's nonstop crew—Insomnia Incorporated—and we have only six days to go."

"Mr. Gilroy is here from the lab," spoke the announcer on Cullen's desk.

Mr. Gilroy was not alone. Three wide-awake, grim-faced technicians filed in after him.

"I'm sorry, Mr. Cullen," the announcer apologized. "The others appeared right after you'd said you would see Mr. Gilroy."

"All right, all right," snapped Cullen. "That's all."

His mustache looked frayed. The head of the Cullen enterprises did not seem as fresh as he had three weeks before. By comparison with his employees he looked seedy where they looked stern.

"Well? What's this?" he blustered.

Gilroy stepped forward. "It's a committee of the few technicians

you still have working for you. I'm talking for the lot."

"Go ahead," sneered Cullen. "Talk!"

"I will. Your drive model is finished. Its installation in the standard hull designated is sheer routine; any apprentice crew could do it in three days. We expect to finish it by tonight."

"And high time," declared Cullen.

"Tonight," Gilroy continued, "we are going home. To bed. For about fourteen hours sleep."

"You mean you're tired?" Cullen asked in surprise. "Why, Wirtberg told me—"

"We're not tired, but you'd better see that we are. Because without being sleepy at all, we desperately want sleep. If we could get narcotics, some of us would have tried them by now. Failing that, it's up to you. Get that fellow who treated us to give us the antidote."

Cullen called on the remnants of his leadership. He essayed a bluff. "What you're asking is impossible. I can't risk months of work, an investment of half a million points, to let you take a nap. You know that I took the antisleep treatment with you. I won't sleep until I have that patent, and by the six-toed mules of Callisto, neither will you!"

The ensuing silence hummed with tension.

"You mean to say you'd deny us sleep," roared one man, "when your model is finished and ready for demonstration?"

"I can't take the risk," retorted Cullen. "You've no right to ask it."

A muttering swelled angrily in answer. He tried to shout it down. As the men closed in on his desk, his fingers frantically sought and pressed a button.

"That's all of it," said a new voice. "The lot of you, about face!"

The insurgents whirled to face Craven, whom they hadn't seen for days. He held a paralyzer, covering them.

"No sleep in this baby," he said, patting the weapon. "Just a few hours of helplessness, then a couple of nausea, and you're on your feet again. It's really not worth it, boys."

They saw the point. Grimly, unforgivingly, they filed out. When the door was shut behind them, Craven sat on the desk.

"They had you going," he said. "Wonder how long it'll take them to see it."

"See what?"

"That you have no antidote. Maybe Wirtberg's holding you up for it—or hasn't he got it either? Don't answer; I know. I've suspected it."

"He's working on it," Cullen confessed tremulously. "I've backed him to the limit. And remember I'm in the same boat you are."

Craven spat on the immaculate floor. "That's all that keeps me from pumping a few needles into you with this." He waved the paralyzer. "I'll go along with you—for a while. But unless Wirtberg does come through soon, I wouldn't underwrite your life insurance."

Cullen sat down trembling. "It takes money. Wirtberg's already

got two hundred thousand, besides what I paid him for the antisleep. He tricked me, but he's our only hope. That's why I can't afford a shared patent. Only full control will bring in the cash I need—to finance Wirtberg, among other things."

"I can see that. So why don't you play for keeps?"

Cullen stared questioningly.

"The models are remote controlled," Craven amplified. "On set wave lengths. So you get a portable projector out there on the test field, out of sight. Tune it to Sanders' outfit, and—"

"Crash his ship?" whispered Cullen.

Craven shrugged. "His drive failed, that's all. He'll never know the difference himself. What you need, of course, is a man who can quietly build a self-tracking beam projector strong enough to blanket Sanders' control."

"Five days left. Can you do it?"

"Single handed, without any of your trained seals to help. I've sort of been thinking it might come to this, so I made plans. It'll cost you double the bonus, and your signature on this."

He flung a much-creased paper before Cullen, who read it between trembling fingers.

"Why, this . . . this is a confession to what *you've* just offered to do!"

Craven grinned. "That's to balance the little paper in your safe. Remember? I wouldn't take the

job unless I'm protected—by having you right in with me where the water's hottest."

Cullen threw the paper aside. "I'm not that crazy."

"No," agreed Craven. "You're sane, and you know just what you'll be up against, when those chaps in the lab find you've sold them insomnia for life."

Cullen sighed.

"Someone called you while you were away, Tony," said Craig as she and Sanders came back the last evening before the test. "Said his name was Anton Gilroy. He wanted to come over if you were in."

Tony's face went a bit pinker than cosmetics made it. "Thank you. I didn't want to see him anyway."

"Gilroy?" asked Sanders. "Whoever he is, he's out of luck. Tony is going to be dated up permanently. As Mrs. Sanders."

Craig beamed. "No surprise to me, but I'm glad it's announced. Congratulations."

"Accepted as due. I think I'm lucky."

"I feel lucky myself," said Tony. "And I think we're going to win tomorrow. Woman's intuition."

"What, no slide rule?" queried Craig. "That reminds me—an inspector from the Patent Commission was here to check our control equipment. Seemed to have credentials, but I didn't take my eyes off him the whole time."

"And everything checked?"

"To the last millicycle. He had me run through the control sequence, checked the receiver frequency, and then got interested in our transmitter. But all he did there was check its frequency and put a seal on it. There it is."

The control sender, a compact cube about one foot on a side, was a standard piece of equipment commonly used for landing robot lifeboats in spatial rescue operations. Four squat levers sticking up from the top gave a total of eight variables. On a fixed carrier frequency, timed pulses were grouped eight different ways to afford as many control signals.

Horizontally around the case, effectively preventing removal of any access panel, ran a broad metal band, its ends joined in a thick metal disk bearing a battered imprint.

"Gives me a funny feeling," Craig commented. "I mean having nothing to do. That seal is symbolic. We're ready, and that's that. I just can't think of anything else to do."

"No?" asked Tony. "Well, I can. Isn't the *Ganymede* still loading?"

"Sure," answered Sanders, mystified. "And why?"

"Because, while she's loading, you're going to ask four or five crew members to spend the evening here—refreshments served. They're going to guard the equipment."

"What's wrong with us for that job?"

"You'll be busy," said Tony positively. "Taking me out to dinner, as a reward for work well

done. And for passing up Mr. Gilroy."

The test field, once a lesser airport in northern Westchester, was covered with a thin ground fog when Craig drove the truck in. Tony and Sanders waved him toward one of the hangars, where their own car was parked beside a little knot of Patent Commission officials. No Cullen equipment or personnel was yet in sight.

"You're a bit early, but that's fine," an official greeted them. "If you'll unload your ship, we'll get busy."

Weighed, measured, examined from stem to stern and identified by a spot-welded plate, the little vessel was laid on a launching cradle.

"Your transmitter next," said the technical inspector.

"But we checked that yesterday," Craig demurred. "It's O.K."

The man shrugged. "It's purely a formality, but the rules call for a frequency check just before the test."

A few minutes later the transmitter, too, had been cleared. Nothing remained but to wait. Slow minutes dragged into half an hour. The ground fog lifted, and more than one official looked impatiently at his watch. But at ten o'clock precisely, the time set, Cullen's crew arrived in two trucks, Cullen himself with them.

The rival ship also was checked quickly, and laid into a second cradle beside the first. Its control transmitter, handled by a burly technician who wore thick-lensed, old-fashioned glasses, similarly passed its frequency test.

"As a routine safety precaution," announced the Committee head, "we shall take stations in a concrete shelter about a mile up the runway. The start will be plainly visible through binoculars, and electronic scanners will keep the ships in watch at all times. They are, of course, to be controlled from the shelter."

The journey to the shelter was quickly made in the trucks. Craig set up his transmitter while Cullen's man did the same. Cullen himself stood silently by.

"As you were first to arrive," the Committee head said to Sanders, "you have the choice of position."

"We're ready."

"Very well. Follow the flight instructions provided you."

Sanders nodded. It was so quiet in the shelter that the flip of the switches under Craig's fingers was plainly audible. At that tense moment Cullen signaled a man of his crew, who instantly left. Sanders took up binoculars to watch the ship, leaving the controls to Craig.

"Output normal," the latter reported in a tight monotone. "Control response normal. Take-off drive cut in. *Drive is cut in—*"

"She's lifting," breathed Sanders, and a sigh escaped Tony as the little vessel a mile away rose as though plucked from the cradle by invisible but incredibly sensitive fingers. For a moment it hovered while the drive output was automatically increased, then flung itself skyward as

though on jets. In thirty seconds it was a speck in the blue.

"Hold it at 4,000," Sanders reminded Craig. "Accelerate at quarter drive for half a mile, then circle."

Under Craig's deft fingers on the levers, the little ship began to move. In three seconds it was streaking toward the observers. In four more its straight course, obedient to Craig's will, had become a curve. And still its speed increased.

"Pinch it down," Sanders cautioned, studying it through the glasses.

Obediently Craig worked the controls. But the little ship, now hurtling in a circular course, continued to gain speed. And the circle widened as centrifugal force overcame the directional thrust of its steering plates.

"Too fast," Sanders said curtly. "Cut the drive. *Cut it.*"

"It's off," gasped Craig, punching levers as though to reassure himself of the fact.

An exclamation as from a single throat went up from the watchers as the little craft staggered in its course. Again and again its nose headed outward, to be momentarily pulled back by its directional drive. And still its speed went up. To the onlookers came the thin scream of its passage through impeding air. The hull, designed to cut only the thin stratosphere at such speed, was approaching the critical velocity of sound.

A sob escaped Craig, frantically break that mad flight. Sanders, as applying every control in turn to in the grip of a nightmare his mind protested as unreal, watched the tiny craft finally break from its erratic course and begin an even wilder zigzag to earth. Unconsciously he put his hands forward as though to stem its power-driven fall.

The crash, three-fourths of a mile away, was a single dull thud of metal driving into hard earth. A cloud of dust instantly expanded over the wreckage. Sanders, already halfway out of the shelter, found himself held by two of the officials.

"Sorry," one of them said sincerely. "Investigation will have to wait until the other ship makes its flight."

Cullen's man bent over his controls. Bitterly Sanders watched the remaining ship rise smoothly, effortlessly, from its berth. At 4,000 feet it accelerated on its straight course. Seven seconds later, faultlessly holding to the speed gained, it swung into a circular course. Then, obedient to the schedule of flight maneuvers called for, it pointed upward and hurled itself toward the invisible stars. In a few seconds it, too, was invisible. All eyes in the shelter turned to the fluorescent spotter screen, which revealed the craft as a luminous dot, while instruments alongside logged its speed and altitude.

"Altitude twenty miles," announced the technical inspector. "You may level off."

The speck on the screen assumed

a course more or less radial to the engraved circles that scaled the miles.

"Maximum acceleration test," ordered the inspector.

The speck fled across the screen, vanished, came abruptly back on the opposite side as the operator swung the scanning beam to keep it in the field.

"Four gravities acceleration," he reported after a moment. "Decelerate in a spiral to 10,000 feet."

Obediently the speck circled, growing brighter all the while. Two minutes ticked by.

"Deceleration satisfactory," said the inspector curtly. "You may land."

Eyes sought the first glimpse of the descending ship. Unseen at first, it suddenly broke through a high cloud. It was dropping swiftly but under complete control.

In silence all watched it come down, hesitate when ten feet up, then gently sink to earth not far from the wreckage of the ill-fated first ship.

"On the basis of the satisfactory demonstration just concluded," said Cullen in what seemed an unnaturally loud voice, "I claim a full patent on the first successful repulsor drive."

Nobody answered him, and he managed to look somewhat foolish. Only the technician at his control unit, looking up, smiled triumphantly at him.

Quietly the four-man Patent Committee gathered up papers and, followed by the technical inspector, left in a service car to examine both ships. Those remaining, having been asked to wait, did so with what patience they could.

The silence was an awkward thing. Cullen, gnawing his mustache impatiently, whispered now and then to his control technician. A few minutes later the technician carried his transmitter out to the truck.

Since the crash Craig hadn't budged, nor spoken a word. Now he suddenly came to life. Like a man possessed with a single purpose, he seized tools from the kit he had carried along, slid a cutter beneath the tape seal, and squeezed the jaws together. The metal snapped—and disintegrated into a tangle of fine wires.

In an instant a score of taut-strung metal strands, hitherto embedded in what had seemed a simple steel strap, were hopelessly snarled. And Craig, fired by some sudden intuition, placed the sealing disk between the jaws of pliers. It crunched like an overripe nut.

Within lay the familiar wafer of a frequency-tuned crystal.

"I knew he hadn't got inside," Craig muttered. "But I never thought of this—"

Sanders clapped his shoulder. "Forget it. If it weren't for you, we wouldn't know even now. This gives us grounds to appeal."

He knew better. There'd be no money to appeal, to fight a dragged-out case in court after court. There was no proof that it was Cullen who had sabotaged them. They'd lost—irrevocably.

In Craig's eyes he read the same

thoughts. Sick, not merely with failure but with the treachery that had caused it, he turned to Tony. And she wasn't there.

"Tony! I thought she was here with us."

He never knew whether suspicion kindled in Craig's eyes first, or in his own mind. But instantly he put it away. Tony a traitor? Loyal, lovable Tony? It was unthinkable. He *wouldn't* think it.

And Craig, seizing his arm, suddenly overbore that resolution with stark fact. For what Craig had seen, what Sanders now had to see, was Tony standing beside Cullen's truck, speaking earnestly to someone inside.

It was Craig who dashed out, Sanders following like an automaton. Tony swung around, startled at their coming.

"Tom! This is Anton Gilroy." The control technician nodded acknowledgment. "We were students together at the Institute of Mathematics. I knew he was one of Mr. Cullen's technicians, so I was surprised when he called yesterday."

"Hardly anything would surprise me now," said Sanders flatly.

The look Tony bent upon him was a searching one. "I recognized Mr. Gilroy inside. So I followed him to ask why he wanted to see me. Perhaps he'll tell us now."

Gilroy spoke reluctantly. "Purely a social matter. I thought we might have dinner together, for old time's sake."

"Sure it wasn't to put a damping coil around our transmitter?" gritted Sanders.

A silence boding no good was broken by Craig, who sprang up on the truck to stare more closely at Gilroy.

"The voice settles it. You were the 'inspector' yesterday. A skin dye, colored contact lenses, and a mustache would add up to it. It was you!"

Gilroy shrugged. "You'd have a hard time proving a thing like that."

"And you phoned Tony beforehand, to make sure she wouldn't be around to recognize you."

"There are plenty of other reasons I'd phone her."

Sanders laid a hand on Craig's arm. "Are you sure?"

"Oh, I'm sure—eighteen hours too late. This is the man who sabotaged our stuff."

Sanders never knew what he might have done, if the Committee had not returned at the moment. The men got out gravely as those waiting converged on them. The spokesman looked soberer than ever.

"Our inspection was brief but conclusive. But first, I think it must be obvious to all that the first ship lacked stable acceleration as well as directional drive energy. It must, therefore, be considered a failure. The second ship completed every required maneuver successfully. It therefore embodies the first successful demonstration of the repulsor drive."

Sanders stifled the desire to turn away.

"The Committee has carefully considered. Despite some irregu-

larity, it has no choice but to grant a full patent to the designer and builder of the second ship demonstrated."

Cullen spoke suavely. "I thank the Committee for its prompt and eminently fair decision. I trust it is final."

"It is. No appeal will be considered. But the successful ship, Mr. Cullen, is not yours. It is the one entered by Pioneer Spaceways, who will be granted the sole patent."

A bombshell of silence exploded over the group.

"You're mistaken!" sputtered Cullen. "You've mixed up the ships."

"I'm afraid so," said Sanders tautly. "There is some evidence that our entry was tampered with, but no doubt that it was our ship which crashed. Will the Committee be good enough to verify its findings?"

The Committee leader nodded. "It has. Both models were carefully identified before the tests. Not only did we weld our own identification plates on them, but we noted in our records such small differences as existed between the similar hulls. They are conclusive. Your technician, Mr. Sanders, controlled the ship that crashed. The successful model was flown by Mr. Cullen's technician. But it was your ship.

"This is the irregularity I referred to before, and the cause of much rechecking. If you have been the victim of sabotage, it has been nullified in a most curious fashion. But our decision stands, based not on the piloting of the models, but on the performance they turned in. The patent is yours, Mr. Sanders."

"Mr. Gilroy is really very nice," said Tony the next morning. "We had a lovely dinner—and he didn't wear those awful glasses."

"Then I hope you said good-by," commented Sanders. "As my wife, which you will be eight hours from now, you won't be seeing much of him."

Tony looked at him and Craig, her eyes sparkling.

"Come on," groaned Craig. "You know what we're waiting for."

"It wasn't a damping coil," said Tony obediently. "It was a compensated inductance, I think he said. What it did was shift your frequency, once he had activated the crystal with a coded signal from his own transmitter, so that you could control Cullen's ship but not your own. Remember, Gilroy went through your control sequence. That was to make certain the one in Cullen's ship would match. He saw to it that it did. His own transmitter was rigged so that he could switch to your frequency after the Committee had checked it for his own. He's quite proud of the gadget that worked it. Nobody else knew."

"But why?"

"Why he did it?" said Tony. "That was hard to learn. He seemed—almost light-headed. Said he wanted to make things interesting, that everything was a bore. Later he admitted he'd disagreed with Cullen, that he suspected your

ship might be wrecked some way, that it wouldn't surprise him if a high-powered blanketing transmitter was rigged up near by. Somebody called Craven, he thought, would do that sort of thing for Cullen. The blanketing beam would have to be very broad, he said—so broad it would blanket Cullen's frequency as readily as yours. Something else he said, crazy as it seems, was that if each of you unknowingly were to fly the other's ship, that would insure a fair test. But I think the real reason was the very last thing he said."

"That's what we want to know. What was it?"

"He simply said—it was good fun."

Four hours later, as the bell in Sanders' apartment rang insistently, Craig swore softly and dropped the black tie he had been trying to knot about Sanders' neck.

"I wasn't cut out to be a valet," he groaned. "Why didn't you ever learn to tie a bow tie yourself?"

"Only mean to get married once, so it isn't worth while. Will you open the door?"

Craig vanished to do so, but the figure that reappeared was another, considerably bulkier.

"Ah, the successful man prepares to celebrate," murmured Wirtberg. "Do not let me interrupt. Permit me, please, to congratulate you."

"Thanks," retorted Sanders. "I was lucky, no thanks to you."

The biochemist raised a pudgy palm. "But yes indeed, much thanks to me. That I have come to explain."

"You owe me no explanation."

Craig, who had returned, asked pointedly, "Shall I show Mr. Wirtberg the door?"

"But no! I have made great effort to come. A chair, if you please. It wearies me to stand long." Of his own accord Wirtberg found a big armchair and sank into it, sprawling like a fleshy mountain. Ignoring him, Craig resumed his manipulation of the tie, which Sanders endured as best he could.

"You will forgive an old man his enfeebled body," croaked Wirtberg. "My tissues are . . . but I did not come to tell you that. You think I did sell you out, yes? But of course you do. So let me explain.

"You wanted the antisleep treatment, to give you more time. And so it would. But time, it is also a term for boredom. Too much time, too much awareness of the same things, to these the mind of man is not tuned. I, Emmanuel Wirtberg, knew the disadvantages of antisleep. Also, there was a matter of money I much needed, that you did not have. So, presto, I took Cullen's money in order to help you."

The silence that followed this was eloquent with disbelief.

"You do not yet wish to see. But consider. This antisleep that you thought would solve your problems, it creates instead new problems for Cullen. Because his men cannot sleep, nor can they dream, and so they become bored. You who sleep may care nothing for dreams, but dream you do, and are refreshed

even though you do not remember those dreams. But a man who cannot dream is forced to strange actions.

"To predict the behavior of men bored even with themselves, it is impossible. They make demands, and are dissatisfied when these are met. They do things having no purpose but to relieve their boredom. Also, their conscience is dulled. The subconscious, it is more ascendant, as it is in normal sleep. Their morality, it becomes amoral, caring only for change and relief for their boredom. Is this a thing to give the man who asks for my help?"

His two listeners looked at him thoughtfully, their attention now wholly won.

"No, rather it is for the greedy enemy of such a man. Physically it is harmless. I, Emmanuel Wirtberg, have long since proved this. And perhaps I, too, am amoral. Needing money greatly, I sell this thing to Cullen. And too late he discovers why it is that I need money. It is for my research, because I must yet find the antidote."

"You mean the one treatment is permanent?" asked Sanders.

"So I learned. My first subject, a monkey named Elmer, he suffered nothing at first. So I say, 'This which is good for monkey is better for man.' And I treat one man who is willing, an intelligent man who will make good use of his freedom, so I believe. Only afterward does Elmer show the effects of psychic fatigue. I regret my hastiness. My human subject is warned. And I, Emmanuel Wirtberg, begin the desperate search for an antidote that has now gone on five years. I neglect all else. My savings vanish. Seeing the need for a brilliant stroke, I treat Cullen, so enlisting his help with much money. And his men, as I foresee, make difficulties that end greatly to your advantage, my young friend."

Sanders nodded thoughtfully. "I see that I owe you an opology. You've protected me despite myself. In fact, I owe the patent to you and Craig here and Tony and Gilroy."

"And perhaps a little even to a villain named Craven," said Wirtberg, "who came to me asking for the antidote, and stayed to tell how he destroyed your first model but could not forego the pleasure—a childish one, born of boredom—of leaving you a riddle in mathematics."

"Which Tony solved," Craig put in.

"I'm indebted to you," Sanders said. "If Cullen isn't able to finance you long enough to find the antidote, I'll help. With the patent, we'll be on our feet soon."

Wirtberg raised a protesting hand.

"But that, thanking you, will not be necessary. Mr. Cullen has been very generous, because he could not help himself. And I have been fortunate, although you are the only ones I have told. Last night I discovered the antidote. This morning Elmer awoke from his

first sleep in five years, refreshed and full of monkey business. The thing is done."

Sanders grinned. "Then Cullen and the others have resigned from Insomnia Incorporated?"

"Not yet, but only because they do not yet know I have the antidote. Let them wait a little. My first obligation, it is to the courageous man I first experimented on, the man who for five years has not slept. Him I gave the antidote an hour ago. Soon, I think, it will take effect."

Sanders looked at the biochemist closely.

"I think I know this man," he said.

Wirtberg nodded slowly. "Yes? You have discernment, then. And you will understand why I have done the things I have done."

Craig looked his bewilderment. But Wirtberg showed no desire to explain. Fat hands clasped over his paunch like those of a beatific Buddha, his eyes shut, he seemed on the verge of snoring.

"Surely," Craig whispered, "he doesn't mean—himself?"

Sanders simply nodded. Together they looked at Wirtberg understandingly.

He *was* snoring.

THE END.

THE ANALYTICAL LABORATORY

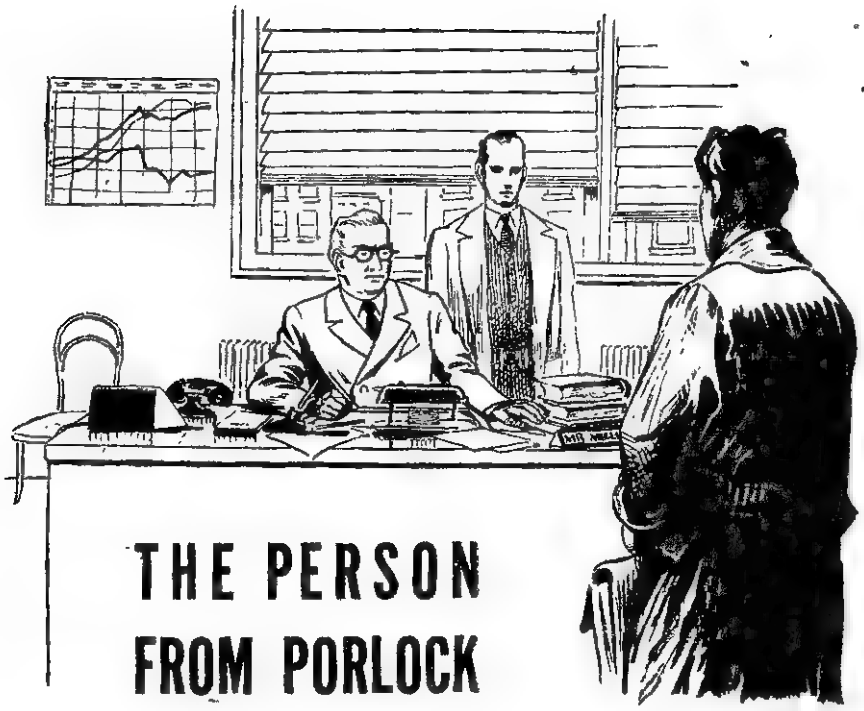
Believe it or not, the order of the stories in an issue of Astounding Science Fiction is determined purely by mechanical considerations of make-up, and has nothing whatever to do with the editorial judgment of their respective excellence. Some of the readers seem to feel that their order from front to back represents our feelings on their quality. Tain't so. Occasionally, they do wind up in the same order in the Lab here, but that's coincidence. This time they almost did—

MAY, 1947 Issue.

Place	Story	Author	Points
1.	Fury (Pt. 1)	Lawrence O'Donnell	1.9
2.	E for Effort	T. L. Sherred	2.27
3.	Tiny and the Monster	Theodore Sturgeon	2.5
4.	Jesting Pilot	Lewis Padgett	3.25
5.	Journey and the Goal	Chan Davis	4.65

—and any time a brand new, first-time-up author succeeds in outpacing a line-up like that, we want more of his work! That December editorial invitation to new authors is showing results!

THE EDITOR.



THE PERSON FROM PORLOCK

Ray Jones suggests a fascinating proposition in this yarn. Maybe you, too, are a victim of persons from Porlock!

Illustrated by Pat Davis

BY RAYMOND F. JONES

Borge, the chief engineer of Intercontinental, glanced down at the blue-backed folder in his hand. Then he looked at the strained face of Reg Stone, his top engineer.

"It's no use," said Borge. "We're canceling the project. Millen's report is negative. He finds the BW effect impossible of practical application. You can read the details yourself."

"Canceling—!" Reg Stone half rose from his chair. "But chief, you can't do that. Millen's crazy. What can he prove with only a little math and no experimental data? I'm right on the edge of success. If I could just make you see it!"

"I *have* seen it. I can't see any-

thing that warrants our pouring out another twenty-five thousand bucks after the hundred and fifty your project has already cost the company."

"Twenty, then. Even fifteen *might* do it. Borge, if you don't let me go on with this you're passing up the biggest development of the century. Some other outfit with more guts and imagination and less respect for high-priced opinion in pretty folders is going to come through with it. Teleportation is in the bag—all we've got to do is lift it out!"

"Majestic and Carruthers Electric have both canceled their projects on it. Professor Merrill Hanford, who assisted Bots-Wellton in the original research, says that the BW effect will never be anything of more than academic interest."

"Hanford!" Reg exploded. "He's jealous because he doesn't have the brains to produce a discovery of that magnitude. Bots-Wellton himself says that his effect will eventually make it possible to eliminate all other means of freight transport and most passenger stuff except that which is merely for pleasure."

"All of which is very well," said Borge, "except that it doesn't work outside of an insignificant laboratory demonstration."

"Insignificant! The actual transfer of six milligrams of silver over a distance of ten feet is hardly insignificant. As for Millen's math, we haven't got the right tools to handle this."

"I was speaking from an engineering standpoint. Of course, the effect is of interest in a purely scientific way, but it is of no use to us. Millen's math proves it. Take this copy and see for yourself. I'm sorry, Reg, but that's the final word on it."

Reg Stone rose slowly, his big hands resting against the glass-topped desk. "I see. I'll just have to forget it then, I guess."

"I'm afraid so." Borge rose and extended his hand. "You've been working too hard on this thing. Why don't you take a couple of days off? By then we'll have your next assignment lined up. And no hard feelings over this Bots-Wellton effect business?"

"Oh, no—sure not," Reg said absently.

He strode out of the office and back to the lab where the elaborate equipment of his teleport project was strewn in chaotic piles over benches and lined up in racks and panels.

A hundred thousand dollars worth of beautiful junk, he thought. He slumped in a chair before the vast, complex panels. This cancellation was the fitting climax to the delays, misfortunes, and accidents that had dogged the project since it began.

From the first, everyone except a few members of the Engineering Committee and Reg himself had been against it. Borge considered it a waste of time and money. The other engineers referred to it as Stone's Folly.

And within Reg himself there was that smothering, frustrated,

indefinable sensation which he couldn't name.

It was a premonition of failure, and there had been a thousand and one incidents to support it. From the first day, when one of his lab assistants fell and broke a precious surge amplifier, the project seemed to have been hexed. No day passed but that materials seemed mysteriously missing or blueprints turned up with the wrong specifications on them. He'd tried six incompetent junior engineers before the last one, a brilliant chap named Spence, who seemed to be the only one of the lot who knew a lighthouse tube from a stub support.

With men and materials continually snafu it was almost as if some one had deliberately sabotaged the whole project.

He caught himself up with a short, bitter laugh. The little men in white coats would be after him if he kept up that line of thought.

He passed a hand over his eyes. How tired he was! He hadn't realized until now what a tremendous peak of tension he had reached. He felt it in the faint trembling of his fingers, the pressure behind his eyeballs.

His disappointment and anger slowly settled like a vortex about Carl Millen, the consulting physicist who'd reported negatively when Borge insisted to the Engineering Committee that they get outside opinion on the practicability of BW utilization.

The cool, implacable Millen, however, could hardly be the object of anything as personal as anger. Yet, strangely enough, he had been the object of Reg Stone's friendship ever since the two of them were in engineering school together.

What each of them found in the other would have been hard to put into words, but there was some complementary view of opposite worlds which each seemed able to see through the other's eyes.

As for Millen's report on the BW project—Reg knew it had been utterly impersonal and rendered as Carl Millen saw it, though the two of them had often discussed it in heated argument in the past. But the very impersonality of Millen's point of view made the maintenance of his anger impossible for Reg.

But never in his life had he wanted anything so much as he wanted to be the one to develop the Bots-Wellton effect from a mere laboratory demonstration to a system able to transport millions of tons of freight over thousands of miles without material agent of transfer.

Now he was cut off right at the pockets. He felt at loose ends. It was a panicky feeling. For months on end he had been working at top capacity. He seemed to have suddenly dropped into a vacuum.

He debated handing in his resignation and going to some company that would let him develop the project. But who would? Majestic and Carruthers, two of the largest outfits, had pulled out, Borge had said. Who else would pick it up?

There was one other possibility,

he thought breathlessly. Reg Stone could take it over!

Why not? He had a beautifully equipped back yard lab and machine shop. Tens of thousands of dollars worth of equipment from the project would have to be junked by Intercontinental. Reg felt sure Borge would let him buy it as junk.

Sure, it would be slow without the facilities of the Intercontinental labs, but it would be better than scuttling the entire project.

He suddenly glanced at the clock on the wall. He'd been sitting there without moving for over an hour. It was lunch time. He decided to go downtown where he wouldn't meet anyone he knew, rather than eat in the company cafeteria.

He chose the Estate, a sea food restaurant three miles from the plant. As soon as he walked in he knew why he had chosen the Estate with subconscious deliberation.

He saw Carl Millen across the room. He had meant to see him. Millen always ate at the same place at the same time.

Millen spotted Reg almost simultaneously and beckoned to him.

"Sit down, Reg. You're the last person I expected to see here. What's new at your shop?"

"Not much—except Borge received a report from Carl Millen & Associates, Consulting Engineers."

Millen grinned wryly. "Did he blow his top?"

"Why did you turn in a negative report?"

"Didn't you read it? I proved the BW effect is absolutely limited by the free atomic concentration in the dispersion field. That limitation utterly forbids any mass application of the principle."

Reg was silent as the waiter brought the menus. They each ordered oysters on the half shell.

"I remember," said Reg, when the waiter had gone, "about 1925 a then very prominent aeronautical engineer wrote a learned piece proving absolutely that planes could never reach five hundred miles an hour."

Millen laughed. "Yes, and there's also the gent that proved a steamship could never carry enough fuel to get it across the Atlantic."

He stopped and looked seriously at Reg. "But for every one of those classic boners there are thousands of legitimate negative demonstrations that have saved engineering and industry untold millions. You know that as well as I do. This is one of them."

"I'll admit the first, but not the second," said Reg. "I've not read your report. I probably won't. It's faulty. It's got to be. The BW principle can be utilized somehow and I'm going to prove it."

"Just how do you propose to do that?" Millen asked, smiling gently. "Something intuitive, no doubt?"

"All right, have your fun, but come around and see me when you want to go on a quick vacation via the Stone Instantaneous Transfer Co."

"Reg, that job I talked about a year ago is still open. I could

offer you Assistant Chief of Development. In a year I could let you in on a partnership. It's worth twenty thousand now, thirty later."

"I could work on the BW outside?"

Millen shook his head. "That's the only string attached. Our men haven't time for anything but customers' projects. Besides, you'd have to get used to the idea of believing in math, not intuition."

"I don't think I'd do you much good."

"You could learn, for that kind of money, couldn't you? What does that cheese factory pay you? About eight or ten?"

"Seven and a half."

"The lousy cheapskates! Three times that ought to be worth shelving your intuition in favor of math."

Reg shook his head. "There isn't that much money in the world. Solving other peoples' riddles for a fee is not my idea of living."

"Sometimes I think you're just a frustrated research physicist. In this business you're in for the money. It's a cinch there's no glory."

The waiter brought their orders, then.

His depression continued with Reg that evening. His three boys sensed it when he turned down a ball game. His wife, Janice, sensed it when he didn't poke his head in the kitchen on the way to his study.

After dinner, and when the boys were in bed, he told her what had happened that day.

"I don't understand why you feel so badly about the cancellation of this particular project," she said when he finished. "Others have been cancelled, too."

"Because it's one of the greatest phenomena ever discovered. It's ripe for engineering application, but no one else will believe it. It's as if they deliberately try to block me in every step. All through the project it's been that way. Now this—chucking the whole business, when we've gone so far! I can't see through the reasons behind it all. Except that they just don't want it to succeed. I've got that feeling about it, and can't rid myself of it. *They want me to fail!*"

"Who does?"

"Everyone! In the drafting room. The lab technicians. The model shop. It seems as if everybody's concern with the project is simply to throw monkey wrenches in the gears."

"Oh, darling — you're just wrought up over this thing. Let's take a vacation. Let the boys go to camp this summer and go off by ourselves somewhere. You've got to have a rest."

He knew that. He'd known it for a long time, but teleportation was more important than rest. He could take care of the neuroses at his leisure, later. That's the theory he'd worked on. Now, all he had was a beautiful neurosis. It couldn't be anything else, he told himself, this absolute conviction that he was being sabotaged in his work, that others were banded against him to prevent the full development of the BW principle.

"Perhaps in a few weeks," he said. "There are some more angles about this business that I must follow up. Let's read tonight. Something fanciful, something beautiful, something faraway—"

"Coleridge," Janice laughed.

They sat by the window overlooking the garden. Their one vice of reading poetry together was something of an anachronism in a world threatened with atomic fires, but it was the single escape that Reg would allow himself from his engineering problems.

Janice began reading softly. Her voice was like music out of a past more gentle and nearer the ultimate truths than this age.

"In Xanadu did Kubla Khan
A stately pleasure-dome decree:
Where Alph, the sacred river, ran—
—that deep romantic chasm which slanted
Down the green hill athwart a cedarn cover!
A savage place! as holy and enchanted
As e'er beneath a waning moon was haunted—"

Reg suddenly stiffened and sat erect, his eyes on the distant golden cavern of the sky.

"That's it," he breathed softly. "That's just how it is—"

Janice looked up from the book, her face puzzled. "What in the world are you talking about?"

"The Person from Porlock. Remember how Coleridge wrote Kubla Khan?"

"No. Who's the Person from Porlock?"

"Coleridge wrote this poem just after coming out of a dope dream. He later said that during his sleep he had produced at least two to three hundred lines. While trying to get it on paper he was interrupted by a person from the village of Porlock. When he finally got rid of the visitor, Coleridge could recall no more of his envisioned poem.

"He was furious because this self-important busybody had interrupted his work and he wrote a poem castigating the Person from Porlock and all other stupid, busy people who hamper the really industrious ones."

"And so—?"

"Don't you see? It's these Persons from Porlock who have made it impossible for me to complete my work. Borge; Millen; Dickson, the draftsman who bungled the drawings; Hansen, the model shop mechanic who boggled tolerances so badly that nothing would work. These Persons from Porlock—I wonder how many thousands of years of advancement they have cost the world!"

In the near darkness now, Janice sat staring at Reg's bitter face. Her eyes were wide and filled with genuine fear, fear of this malign obsession that had overtaken him.

"The Persons from Porlock," Reg mused, half aloud. "Wouldn't it be funny if it turned out that they were deliberately and purposely upsetting the works of other men. Suppose it were their whole object in life—"

"Reg!"

He was scarcely able to see Janice

in the settling gloom, but he felt her fear. "Don't worry, Janice, I haven't gone off my rocker. I was just thinking— Sure, it's fantastic, but Coleridge was one of the world's geniuses. Perhaps he glimpsed something of a truth that no one else has guessed."

Reg went into Borge's office early the next morning. The chief engineer frowned as he saw Reg Stone. "I thought you were going to take a few days."

"I came in to ask what you are going to do with the equipment that's been built for my BW project."

"We'll store it with the miscellaneous plumbing for a while, then junk it. Why?"

"How about doing me a big favor and declaring it junk right away and letting me buy it—as junk?"

"What do you want the stuff for?"

"I want to continue the BW experiments on my own. You know, just putter around with it in my shop at home."

"Still think it will amount to something, eh?"

"Yes. That's why I'd like to buy the stuff, especially the velocitor chamber. It would take me a couple of years to build one of those on my own."

"I'd like to do it as a favor to you," said Borge, "but Bruce, the new manager has just made a ruling that no parts or equipment may be sold to employees. It was all right during the war when the boys were outfitting their WERS stations on company time and equipment. We were on cost plus then, but too many are trying to refurnish their amateur stations now at our expense. So Bruce cut it all out."

"But that doesn't make sense with such specialized stuff as I've had built for the BW. It's no good for anything else."

"Maybe you could talk Bruce out of it. You know him."

Yes, he knew Bruce, Reg thought A production man who, like many of his kind, considered engineers mere necessary evils. It was utterly useless to ask Bruce to make an exception to one of his own regulations.

Persons from Porlock—

Persons from Porlock—

The words echoed like a tantalizing refrain in his mind as he went downstairs towards his own lab. He knew he should forget that impossible concept, but the words were like a magic chant explaining all his misfortunes.

This huge plant and all the technological advances that had come out of it, could not exist without Borge and Bruce, and the others like them. Yet, at the same time, these Persons from Porlock constituted the greatest stumbling block to modern scientific development. Every engineer in the world at some time had been stymied by one of them—an unimaginative chief, a stupid factory manager, incompetent draftsmen, model shop machinists, secretaries, expediters, administrators—

As he passed the open door of the company's technical library he

spotted Dickson, his head draftsman on the BW project, sitting inside at a table. He went in.

Dickson looked up. "Hello, Reg. I wondered where you were this morning. I just heard about them junking the project. It's a devil of a tough break."

"Are you really sorry, Dickson?" said Reg.

The draftsman looked sharply. "What do you mean? Of course I hate to work on a project and see it canceled. Who wouldn't?"

"You know, looking back, it appears as if we hadn't made each

one of about fifty boners, the project would have succeeded. For example, that dimension on the diameter of the focusing cavity in the assembly unit. It's the only one in the assembly that wouldn't be obvious to the model shop, and it's the only one on which you made a mistake in spite of our checking. A seven that looked like a two in your dimensioning. That made the difference between success and failure and lost us nearly four weeks while we looked for the bug in the unit."

"Reg, I've told you twenty times I'm sorry, but I can't do anything about it now. A hair on my lettering pen made just enough of a boggle of the figure so that those dopes in the model shop misread it. It was a worse two than it was a seven. They should have checked us on it even if we did miss it."

"Yeah, I know. It just seemed funny that it was that particular dimension you were drawing when the hair got on your pen."

The draftsman looked at Reg as if stunned by the unspoken implication. "If you think I did that on purpose—!"

"I didn't say that. Sure it was an accident, but why? Was it because you didn't want the thing to succeed—subconsciously?"

"Of course not! It was of no material interest to me, except, of course, as I said before I have the same enthusiasm to see a project on which I work turn out successfully as you do."

"Yeah, I suppose so. Just forget I said anything."

Reg left Dickson and walked back to the hall. Persons from Porlock—were they consciously malicious or were they mere stupid blunderers? More likely the latter, he thought, yet there must be some subconscious desire to cause failure as was the case with the mysterious accident prones so familiar to insurance companies.

The more he considered it, the less fantastic the Person from Porlock concept seemed. It was entirely possible that the genius of the poet, Coleridge, had hit upon a class of persons as definite and distinct as accident prones—and a thousand times more deadly.

There could hardly be any other explanation for the stupid blunder of Dickson in drawing the focusing cavity. He had done far more complex drawings on this project, yet that single dimension, of an extremely critical nature, had been the one to be botched.

And it meant there were others like him in the model shop because any machinist with half an eye for accuracy would have checked that figure before going ahead and shaping up the part to such critical tolerances.

He turned into the machine shop where Hansen, the machinist who'd done the job on the cavity, was working.

"Pretty nice work." He nodded towards the piece in the lathe.

"I hope the engineer thinks so," Hansen growled. "They give me plus five thousands on this thing and no minus. Next they'll want

flea whiskers with zero-zero tolerance."

"You're good. That's why you get the tough ones."

"I wish the guy on the payroll desk would take note."

"But you know, there's something that's bothered me for several weeks. You remember that cavity you made for me with a one two five interior instead of a one seven five?"

Hansen turned wearily to the engineer. "Reg, I've eaten crow a hundred times over for that. I told you it looked like a two. Maybe I need my eyes examined, but it still looks that way."

"Did you have any reason for *not* wanting the cavity to work?"

"Now, look!" Hansen's anger suffused red through his face. "I'm paid to turn out screwball gadgets in this shop, not worry about whether they work or not."

"Didn't it occur to you to check that boggled figure?"

"I told you it looked all right!" Hansen turned angrily back to his lathe and resumed work.

Reg watched the mechanic for a moment, then left the shop.

The bunglers seemed to have no personal interest in their botch work, he decided. It must be something entirely subconscious as in the case of accident prones. That didn't make them any less dangerous, however. Without them on his project he would have been able by now to demonstrate the practicability of BW utilization.

But, following this line of reasoning, why couldn't the teleportation equipment be made to work now? According to all his theory the equipment he had built should have been capable of acting as a pilot model for a larger unit and it should have been able to transfer hundred pound masses at least a thousand feet. Yet, it had failed completely.

Granting that he himself was not a Person from Porlock—

But could he grant that?

Maybe the greatest blunders were his own. His failure to catch Dickson's mistake early enough, for example!

That was the one premise he could not admit, however. It led to insolvable dilemma, rendered the problem completely indeterminate. He had to assume that he was not one of the bunglers.

In that case, why did the equipment fail to work?

It meant that some of the blunders introduced by the Persons from Porlock still remained in the equipment. Remove them, and it should work!

He'd have to go over every equation, every design, every specification—point by point—compare them with the actual equipment and dig out the bugs.

He went into his own lab. He dismissed the asistants and shut the door. He sat down with the voluminous papers which he had produced in the ten months of work on the project. It was hopeless to attempt to go over the entire mass of work in short hours or days. That's what should be done, but he could cover the most vulnerable

points. These lay in the routine, conventional circuits which he had left to his assistants and in whose design the draftsman and model shop had been trusted with too many details.

The first of these was the amplifier for the BW generator, whose radiation, capable of mass-modulation, carried the broken down components of the materials to be transported. The amplifier held many conventional features, though the wave form handled was radically unconventional.

It contained two stages of Class A amplification which had to be perfectly symmetrical. Reg had never made certain of the correct operation of these two stages by themselves. Spence, his junior engineer, had reported them operating correctly and Reg had taken his word on so simple a circuit.

He had no reason now to believe that anything was wrong. It was just one of those items left to a potential Person from Porlock.

He disconnected the input and output of the amplifier and hooked up a signal generator and a vacuum tube voltmeter. Point by point he checked the circuit. The positive and negative peaks were equal and a scope showed perfect symmetry, but in the second stage they weren't high enough. He wasn't getting the required soup. The output of the tube in use should have been more than sufficient to produce it.

Then he discovered the fault. The bias was wrong and the drive had been cut to preserve symmetry. Spence had simply assumed the flat tops were due to overloading.

Reg sat in silent contemplation of the alleged engineering and poured on self-recrimination for trusting Spence.

This was the reason for the apparent failure of the whole modulator circuit. Because of it, he had assumed his theory of mass modulation was faulty.

Spence was obviously one of them, he thought. That meant other untold numbers of bugs throughout the mass of equipment. During the remainder of the morning and in the afternoon he adjusted the amplifiers and got the modulator into operation. He uncovered another serious bug in an out-of-tolerance dropping resistor in the modulator. He contemplated the probability of that one defective resistor among the hundreds of thousands of satisfactory ones the plant used—the probability of its being placed in exactly that critical spot. The figure was too infinitesimal to be mere chance.

By quitting time he had the circuit as far as the mass modulator functioning fairly smoothly. He called Janice and told her he wouldn't be home until late. Then he worked until past midnight to try to get the transmission elements to accept the modulated carrier. The only result was failure and at last he went home in utter exhaustion.

The next morning, refreshed, he was filled with an unnatural exuberance, however. He had the key

to the cause of his failures and he felt success was only a matter of time. If he could just get that necessary time—

The broad parking lot was dotted with infrequent cars at the early hour of the morning at which he arrived. Gail, the lab secretary, was already at her desk, however, when he walked in. She called to him, "Mr. Borge wants you to come up, Reg."

"O.K. Thanks."

He turned and went back out the door towards the chief engineer's office. This would be the new project, he thought. He strode in and Borge looked up with a brief nod.

"Sit down, Reg." The lines of Borge's face seemed to have eroded into deeper valleys in the short time since Reg had last seen him.

"I hear some things I don't like," said Borge suddenly. "About you."

"What sort of things? I haven't "

"Dickson and Hansen have been saying you've accused them of deliberate sabotage on your project. True or not, whatever is implied by these rumors can't go on. It can wreck this shop in a month."

"I didn't accuse them of anything!" Reg flared. "I just asked if they wanted the project to fail. Of course, I didn't expect them to say that they did, but their manner showed me what I wanted to know."

"And what was that?"

Reg hesitated. This development was nothing that he had expected. How would Borge, as one of the Persons from Porlock, react to Reg's knowledge of them? Did Borge even understand his own motives? Whether he did or not, Reg could make no rational answer except the truth.

"I found that they did, subconsciously, want the project to fail. I believe this is the explanation of the numerous blunders without which my project would have been a success."

"You believe, then, that your failure is due to the . . . ah, persecutions . . . of these persons, rather than to any inherent impossibility in the project itself or your own inability to bring it off?"

"I haven't a persecution complex, if that's what you're trying to say," Reg said hotly. "Look, Borge, did you ever hear of accident prones, who plague insurance companies?"

"Vaguely. I don't know much about the subject."

"I can prove there is another kind of prone, a blunder prone, whose existence is just as definite as that of the accident prone. I call these blunder prones 'Persons from Porlock' after the one named by the poet, Coleridge, when his great poem, 'Kubla Khan,' was ruined by one of them."

"And just what do these . . . er, Persons from Porlock do?"

"They make mistakes in important work entrusted to them. They interfere with others who are doing intense and concentrated work so that trains of thought are broken and perhaps lost forever, as in the case of Coleridge. And as in my own case. I could tell of at least a hundred times when I have been

deliberately interrupted at critical points of my calculations so that work had to be repeated and some points, only faintly conceived, were totally lost."

"Which couldn't have been due to your own nervous strain and overworked condition?"

"No."

"I see. These Persons of Porlock generally persecute the intelligent and superior people of the world, is that it?"

Reg's anger flared. "I'm not a psychoneurotic case and I'm not suffering from a persecution complex!"

Suddenly, cold fear washed over Reg. Borge's pattern of reason was clear, now. He would dismiss the whole matter as a neurotic complex and let Reg out of the lab. He would be blackballed with every other company in which he might have another try at BW work.

"I know you're not," Borge was saying, "but you are tired. For six years you've been turning out miracles. I hate like the devil to see you come up with something like this, Reg. Surely you must realize it's all the result of overwork and fatigue. No one is going around interfering with your work. Your mind refuses to admit defeat so it's automatically throwing it off on someone else. I'm no psychologist, but I'll bet that's close to the right answer. I want you to have Walker at the Clinic examine you. I'm willing to bet he recommends a long rest. I'll give you six months with pay if necessary. But I can't let you back in the lab unless you do this. A repetition of yesterday's performance and the whole place would be shot up. You've got to get rid of this Person from Porlock business."

The pieces of the whole puzzle locked into place with startling clarity for Reg. He knew that the last uncertainty had been removed. They were *not* random, subconsciously motivated performers. These Persons from Porlock were skillfully conscious of what they were doing. Borge could not hide the knowledge that his eyes revealed.

But *what* were they doing?

Six months—it would be too late. then. His sense of blind urgency told him that. Borge was simply showing him that there was no possible way that he could win.

He tried again. "I can't expect you to believe these things. I know it sounds fantastic. Any psychiatrist would no doubt diagnose it as a persecution complex. But I promise that no more incidents like yesterday's will take place. Give me the new assignment, but let me work on the BW just six weeks in my spare time, on my own. I'll guarantee I'll have it working in that time."

Borge shook his head. "That's the main trouble with you already—overwork. You've been pushing yourself so hard that your nerves are all shot. Anyone walking by while you are computing is such a disturbance that you think he's deliberately interfering with you. Put yourself in the care of a good doctor and let me know his report.

That's the only condition upon which I can let you stay with the company. I hate to put it that way. I wish you'd try to understand for yourself—but if you won't, that's the way it's got to be."

Reg stood up, his body trembling faintly with the fury of his anger. He leaned forward across the desk. "*I know who you are!* But I warn you that I won't stop. Somehow I'm going to carry this work through, and all you and your kind can do won't stop me!"

He whirled and strode from the office, conscious of Borge's pitying glance upon his back. Conscious, too, that he was walking out for the last time.

The fury and the anger didn't last. When he got outside, he was sick with frustration as he glanced back at the plant. He had acted stupidly through the whole thing, he thought, letting them cut him off from any access to the BW equipment without a struggle.

Yet, how else could he have conducted himself? The whole thing was so fantastic at first that he couldn't have outlined a rational program to combat it.

Maybe Borge was right in one respect. He *was* devilishly tired and exhausted from the long war years of uninterrupted work. There'd been that micro-search system on which he'd spent two years at Radiation Lab. One such project as that would have sent the average engineer nuts. As soon as it was in production he'd tackled an equally tough baby in the radar fire-control equipment that had gone into fighter planes four months after he took over the project cold.

Yeah, he *was* tired—

Janice was surprised to see him, and was shocked by the pain and bewilderment on his face.

Slowly, and carefully, he explained to her what had happened. He told her how Borge had built up a case against him out of the things he'd said to Dickson and Hansen. He told her how they and Spence and the rest had sabotaged his project.

"They've got me licked," he finished. "They've done what they started out to do, knocked out the BW project."

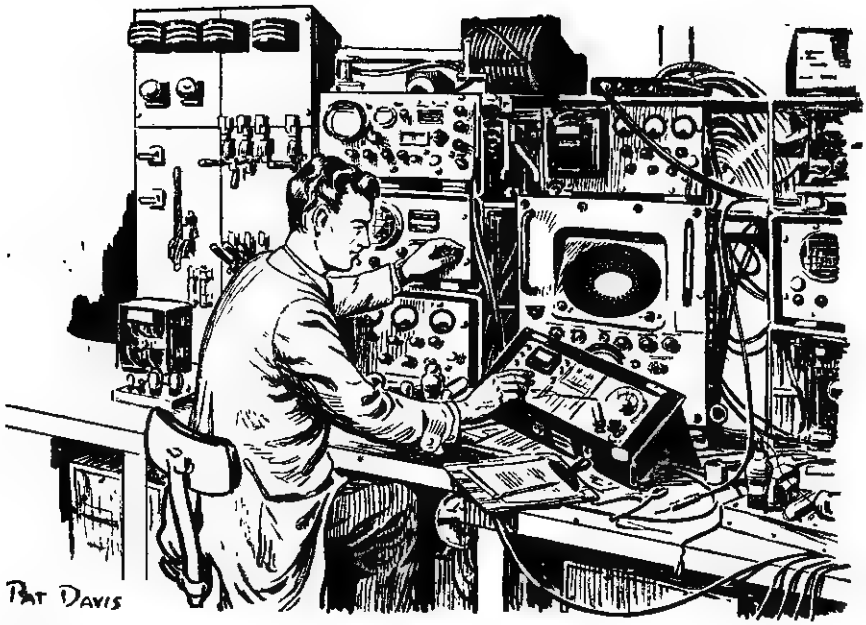
Janice had sat quietly during his recital, only her eyes reflecting the growing terror within her.

"But, darling, why should they want to hinder the project? What possible reason could there be behind it, even if these mysterious Persons from Porlock actually existed?"

"Who knows? But it doesn't make any difference, I suppose. They're so obvious that I don't see how the world has failed to recognize them. Yet . . . you don't believe a thing I've said, do you?"

"They can't exist, Reg! Borge is right. You're tired. This notion is only something that your mind has seized upon out of Coleridge's fantasy. It has no basis in reality. Please, for my sake, take a visit to the Clinic and see if they don't advise rest and psychiatric treatment for you."

Like a cold, invisible shell, lone-



liness seemed to coalesce about him. There was the illusion of being cut off from all sight and sound, and he had the impression that Janice was sitting there with her lips moving, but no sound coming forth.

Illusion, of course, but the loneliness was real. It cut him off from all the world, for where was there one who would understand and believe about the Persons from Porlock? They surrounded him on every side. Wherever he turned, they stood ready to beat down his struggles for the right to work as he wished. Perhaps even Janice—

But that premise had to be denied.

"I'll let them tap my knees and my skull if it will make you happier," he said. "Maybe I'll even beg Borge to take me back if that's the way you want it. It doesn't matter any more. The BW project is dead. They killed it—but don't ever try to make me believe they don't exist."

"They don't! They don't Reg. You've got to believe that. Quit deluding yourself—"

Quite suddenly, it was beyond his endurance. He strode from the room and out into the brilliance of the day, brilliance that was like a cold, shimmering wall surrounding him, moving as he moved, surrounding but not protecting.

Not protecting from the glance of those who passed on the street nor from those who came towards him, nor those who followed after in a steady, converging stream.

He felt their presence—the Persons from Porlock—like tangible, stinging auras on every side. They

surrounded him. They were out to get him.

His stride broke into a half run. How long his flight continued he never knew. It was dimming twilight when he sank, half sobbing from exhaustion, onto a park bench miles from home.

He looked about him in the gathering darkness, and somehow it seemed less evil than the light and the thousand faces of the Persons from Porlock who drifted by on every side.

If only he could drag one of them out into the open where all the world could see it and believe—that would be one way of escape from the soundless, invisible prison in which they had encased him. He had to show that they existed so that no one in the world would doubt his word again. But how?

What incontrovertible proof of their existence did he possess? What was there besides his own feelings and beliefs? He shuddered with realization that there was nothing. His knowledge, his evidence of them was of the flimsiest kind. There had to be something tangible.

But *could* there be more? Insidiously, doubts began to creep into his mind. He remembered the look in Borge's eyes, the pity and the fear in Janice's.

He rose stiffly from the park bench, cold fear driving his limbs to carry him out into the lights. If he were to remain sure of his own sanity, he had to first prove to himself beyond any doubt that the Persons from Porlock existed in actuality, not merely in his own suspicions.

There was one way by which he might be able to do this. That way lay through the report of Carl Millen and the mathematics by which he had "proved" the BW effect impossible of mass exploitation.

The math was deliberately false, Reg knew. If he proved it, confronted Millen with the fact—

He caught a taxi home. Janice met him, dry-eyed and with no questions or demands for explanations. He offered none, but went to his study and took out Millen's report. He asked Janice to brew up a pot of coffee and he began the slow weaving of a pathway through the tortuous trail of Millen's abstruse mathematical reasoning.

Sleep at last forced abandonment of his work, but he arose after a few hours and turned to the pursuit again. All through the day he kept steadily at it, and in the late afternoon he caught the first threads of what he was searching for. A thread of deliberate falsification, a beckoning towards wide paths of illogic and untruth.

It was so subtle that he passed it twice before recognizing it. Something of the intense deliberation chilled him when he realized the depths of the insinuations. It was like the devil's nine truths and a lie that he'd heard country preachers talk about when he was a boy.

This work of Carl Millen's was

certainly the nine truths—and the one, black, insidious lie.

Now that he recognized it, following its development became easier until he trailed it to the final, colossal untruth that the free atomic concentration in the dispersion field made large scale application impossible.

This was it! Proof!

The triumph of his discovery swept away the exhaustion that had filled him. Let them call it a persecution complex now!

He put the report and his pile of computations in his brief case and told Janice he was going to Millen's.

As he drove with furious skill towards town he wondered what Millen's reaction would be. He could call Reg crazy, deny he was a Person from Porlock—but he could never deny the evidence of his deliberate falsifications.

The secretary told Reg that Millen was busy and would he sit down?

"Tell him it's Reg Stone, and I've found out what he tried to do in the BW report," said Reg. "I think he'll see me."

The girl glanced disapprovingly at the engineer's disheveled appearance and relayed the information. Then she nodded towards the polished, hardwood door.

"He'll see you."

Reg opened the door sharply. Carl Millen looked up from behind the desk in the center of the room. His face was unsmiling.

Then Reg saw the second person in the room. Spence, his junior engineer on the BW project. The man's unexpected presence gave him a moment's uneasiness, but it would make no difference, Reg thought—since Spence was one of them, too.

"So you think you've found something in my report?" said Millen. "Pull up a chair and show me what you mean."

Reg sat down with slow deliberation, but he left his brief case closed.

"I think you know what I mean," he said. "I don't believe it's necessary to go into the details. You deliberately invented a false line of reasoning to prove the BW effect useless."

"So? And what does that prove?"

His failure to deny the accusation took Reg aback. There was no trace of surprise or consternation on Millen's face.

"It proves that you are one of them," said Reg. "One with Dickson, Hansen, Borge, and Spence here—one of those who fought to keep me from developing teleportation. I want to know why!"

Millen's face relaxed slowly. "One of your Persons from Porlock?" Amusement touched his face at the words.

"Yes."

Millen leaned forward, his almost ominous seriousness returning. "You've done a good job, Reg. Better than we hoped for a while. It looked for a time as if you weren't going to get it."

Reg stared at him. The words made no sense, but yet there was an admission here of the unknown that chilled him.

"You admit that you falsified the facts in your report? That you are one of the Persons from Porlock?"

"Yes."

The stark admission echoed in the vast silences of the room. Reg looked slowly from one face to the other.

"Who are you? What is your purpose?" he asked hoarsely.

"I'm just like you," said Millen. "I stumbled into this thing when I first opened my consulting service. Spence is the one that can tell you about it. He's the different one—your real Person from Porlock."

Reg turned to his former junior engineer. Somehow, this was what he had known since he first entered the room. Spence's face held a look of alien detachment, as if the affairs of common engineers were trivial things.

His eyes finally turned towards Reg's face and they seemed to burn with a quality of age despite the youth of his face.

"We came here a long time ago," said Spence slowly. "And now we live here and are citizens of Earth just as you are. That is our only excuse for meddling in your affairs. Our interference, however, gives you the same safety it does us."

Reg felt as if he were not hearing Spence, only seeing his lips move. "You *came* here? You are not of Earth—"

"Originally, no."

And suddenly Reg found Spence's words credible. Somehow, they removed the fantasy from the Person from Porlock concept.

"Why haven't you made yourselves known? What does all of this mean?"

"I did not come," said Spence, "but my ancestors did. They had no intention of visiting Earth. An accident destroyed their vessel and made landing here necessary. The members of the expedition were scientists and technicians, but their skill was not the kind to rebuild the ship that had brought them across space, nor were the proper materials then available on Earth.

"They became reconciled to their fate, and knowing that the chance of communication with the home planet, and knowing that the chance of being found was infinitely remote. They were skilled in the biologic sciences and managed in a generation or two to modify their physical form sufficiently to mingle undetected with Earthmen, though they kept their own group affiliation.

"From the first, they adopted a policy of noninterference, but they found living standards hardly suitable and built secret colonies where their own life and science could develop apart from that of Earthmen.

"It was one of these colonies which the drugged mind of your poet, Coleridge, was able to see in his unconsciousness, and which he began to describe in 'Kubla Khan'. My people had detected the presence of his perceptions and one of them was sent immediately to interrupt the work of recollection

because they didn't want their colony revealed with such accurate description as Coleridge could make. The Person from Porlock was this disturbing emissary."

Spence smiled for the first time, briefly. "So you see, your designation of all of us as Persons from Porlock was not far from the truth."

"But why have you interfered with me? Why don't you make yourselves known and offer your advanced science to the world?"

"Surely you are sufficiently familiar with the reaction of your own people to the new and the unknown to make that last question unnecessary. We aren't concerned with advancing your science. It is progressing rapidly enough, too rapidly for your social relationships, which would benefit by some of the energy you expend on mechanical inquiries.

"In our own science we have great fields of knowledge which do not exist in yours. One is a highly specialized field of what we term prognostication logics. Your symbolic logic sciences are a brief step in that direction—very brief. We are enabled to predict the cumulative effect of events and discoveries in your culture. We take a hand in those which indicate a potential destructive to the race. We interfere to the point of preventing their development."

Reg stared at Spence. "How could my teleportation development imperil the race? Surely that was no excuse for your interference!"

"It was. It isn't obvious to you yet because you haven't come to the discovery that teleportation can be quite readily accomplished from the transmitting end without the use of terminal equipment. Further along, you would have found no receivers necessary. Everything could be done from the transmission end."

"That would have made it a thousand times more valuable!"

"Yes? Suppose the cargo to be transported was the most destructive atomic bomb your science is capable of building."

The impact of that concept burst upon Reg. "I see," he said at last, quietly. "Why did you let us produce the bomb at all?"

"We were rather divided on that question. Our computations show a high probability that you will be able to survive it, but only if a number of auxiliary implements are withheld, teleportation among others. There were some of us who were in favor of preventing the bomb's construction even with the assurance our computations give but their influence was less than that of us who know what benefits atomic energy can bring if properly utilized. As a group, we decided to let the bomb be produced."

"But the BW effect can never be utilized?"

"Not for some centuries."

Spence seemed to have said all that he was going to say, but Millen moved uneasily.

"I can never tell you how glad I am that you uncovered my math," he said. "You know the alternative if you hadn't?"

"Alternative—?" Reg looked

across the desk. Then he remembered, that night, sitting in the park, seeing the shadows against the distant lights, the ghastly pursuit of imagined terrors.

"The alternative was—insanity?"

Millen nodded.

"Why? Couldn't it have been done some other way?"

Millen avoided the question. "You will never attempt to develop the BW effect now, will you?"

"No. Of course not."

"It wouldn't have been that way if Spence or some other had come to you and warned you that it wasn't to be done. You'd have laughed at him as a crackpot. Now there's no doubt in your mind."

Reg nodded slowly and cold sickness lodged in his vitals at the thought of what he had so narrowly escaped. "Yes, I see. And now I suppose I shall go back and eat crow for Borge. That is, if you will put in a good word for me with your man." He smiled wryly towards Spence.

"We have a bigger job for you," said Millen. "I still want you here."

"Doing nail puzzles and answering riddles for customers too stingy to run their own development labs? Not me!"

"Not that, exactly. We need you to take over my job. I've got something else lined up to take care of."

"What are you talking about? Take over as head of Carl Millen & Associates? That would be worse than the puzzles—desk arthritis."

"No. Who's the best man in the world today on interference with the utilization of the BW effect?"

"I don't understand you."

"You're that man. We need somebody to take charge of the whole project of BW interference. Spence has another assignment for me, but Bots-Wellton himself still needs to be worked on. Carruthers and Majestic haven't stopped their projects yet. That was only a blind to fool your company. They've got to be stopped yet. A couple of universities are working on it. It's a big job, and you're the best equipped man in the world to handle it—under Spence's direction, of course. You see, his people won't do the detail work after some of us once become trained in it. It's up to us to fry our own fish. Will you take it?"

Reg stood up and went to the window, looking down upon the street crawling with ever hopeful life. He turned back to Spence and Millen.

"How could I do anything else in the face of the drastic indoctrination and persuasion course you've given me. Sure I'll take it!"

Then he laughed softly. "Reg Stone: Person from Porlock!"

THE END.

BROAD BAND

BY J. J. COUPLING

***Only** so much of anything can go through an opening of a given size under a given pressure, in unit time. The width of the band of frequencies an electrical circuit will pass determines the size of the electrical "opening" and thus the rate of flow of information passed.*

It's sometimes hard to give just credit for great inventions, but in one modern instance, at least, we can properly recognize the man responsible. George O. Smith really put the matter transmitter on its feet by describing exactly how it works. As told in the Smithian yarns, the object to be transmitted —a watch, for instance—is electronically scanned, atom by atom, one presumes, and this atom-by-atom specification is transmitted to a receiver, which reconstructs an exact replica of the original object. Presumably the signal picked up by the scanning beam would have to be amplified considerably if it were to be sent any distance and made to actuate a reconstruction device at the other end of the circuit. This thought immediately brings up the question of what sort of amplifiers would be needed, and how wide a band of frequencies they would have to amplify. Would a television amplifier do, for instance? We know that in general, the amount of intelligence any linking circuit can convey in a given unit of time is limited by the width of the band of frequencies it can pass, so by a little computation we can determine whether or not an amplifier of given bandwidth will pass the amount of intelligence required for a complete atom-by-atom specification of a selected object in a reasonable amount of time.

Let's see now.

Suppose we do want to send a watch, say, an iron watch weighing

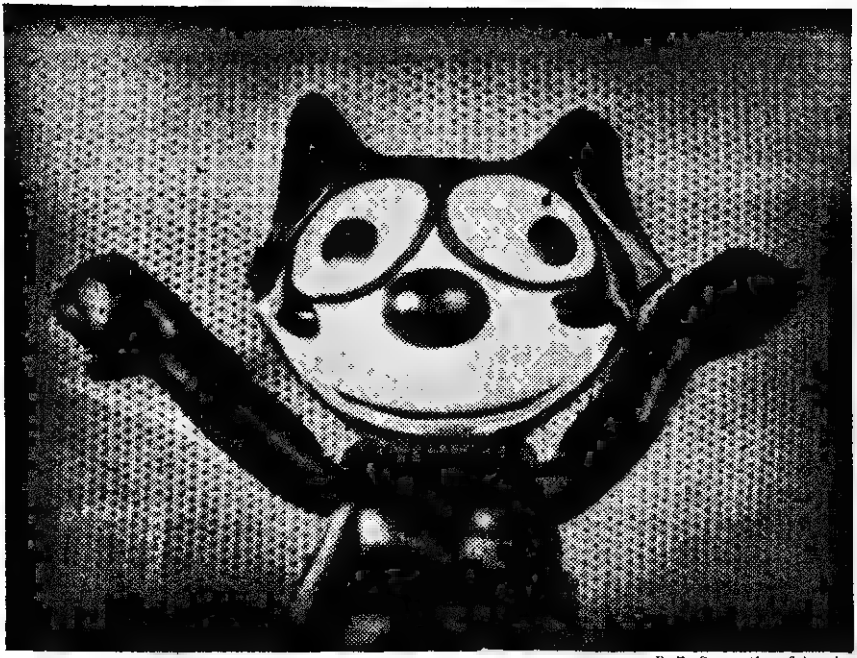
Radio Corporation of America

A bit fuzzy, what? At only 60 scanning lines per inch of screen this television image leaves a good many things to be desired, including recognizability! Better image definition requires more lines per inch, which in turn requires that the whole video system pass a wider band of frequencies.

one ounce or about 28 grams. Now, the atomic weight of iron is about 56, so, dividing the 28 grams by 56 we find that the watch represents ½ gram mols of iron. There are 6 followed by 23 zeros molecules—or, in this case, atoms—per gram mol. Let's assume that in scanning the watch we pick up a voltage characteristic of the constitution of every atom involved. Most of these voltages will be that characteristic of iron, but some will describe the carbon in the steel, or various alloying materials, or the jewels in the bearings. We have in our half gram mol 3 followed by 23 zeros atoms to describe. If we send the watch in 15 minutes or 900 seconds, the voltage that does the describing must be able to fluctuate 3.3 followed by 20 zeros times a second. This is a frequency of 330 million million megacycles. Assuming our band starts at zero frequency and extends up to this

Better, huh? Our old friend Felix the Cat looks more like himself and less the hobgoblin when scanned at 343 lines per inch. But the system has to pass a band of frequencies about 2 megacycles wide to produce this improved degree of definition.

Radio Corporation of America



Radio Corporation of America

Hm-m-m, better yet. At 441 lines per inch even the fine lines visible on Felix's nose, eyes and tummy in second picture have almost vanished. Yes, it takes an even wider bandwidth system, too.

as a limit, an amplifier to handle the matter signal must handle audio frequencies, radio frequencies right out through microwaves, heat, light, ultraviolet, X rays, and on out into the middle of the gamma-ray band. The tube boys will have to work pretty fast!

Recently the Bell Telephone Laboratories announced the development of a vacuum tube capable of amplifying a band of frequencies 800 megacycles wide, a figure astonishing enough for most engineers familiar with the problem of wide band amplification, yet this would be only a small step toward the matter transmitter amplifier. Perhaps a short illustration will give an idea of the capabilities of this new tube as compared to the requirements of some amplification problems already familiar to most everybody, including Sinatra lovers.

With a few exceptions, the ears of average people can hear a range of frequencies from about 15 to about 18,000 cycles per second. A good FM radio will reproduce for the listener a range of about 50 to

15,000 cycles, almost all the average ear can hear. Thus the bandwidth required for good audio reproduction can be called 15,000 cycles in round figures, and it is easy to see that the new tube with its 800 *million* cycle bandwidth is 53,000 times as broad as the audio channel. Maybe this comparison is a little unfair, for we know that the *radio* end of an FM receiver has to accept a band not just 15,000 cycles, but 150,000 cycles wide, since the FM transmitter carrier frequency swings that far. This wide carrier swing is what gives FM radio its ability to overcome static and other amplitude types of interference. But even considering this aspect, the new tube still has enough bandwidth to handle some 53,000 FM channels. The Bell Laboratories appears to have made a cautiously conservative estimate by saying it will handle at least 10,000 simultaneous telephone conversations.

These figures however, while startling enough to the practicing engineer, will probably not blast off the toupees of most Astounding Science Fiction readers. The men at Venus Equilateral produce a lot more than a few hundred megacycles bandwidth in half an hour with a pencil, a tablecloth, and a few gallons of beer. Something must be wrong with our Earth-bound radio engineers, who've been beating their brows to bits ever since television began to get amplifiers with something like 10 megacycles bandwidth. And much of the browbeating has been against a stone wall, too, for when the bandwidth finally came along the difficulties had been more by-passed than overcome.

What has made it hard for radio engineers to make broad-band amplifiers? We find out very easily if we draw a circuit for a one-stage vacuum tube amplifier. Such a circuit is shown in Figure 1a. The elements of the vacuum tube are the hot, electron-emitting filament, the control grid through which the electrons must pass, and the positive plate on which they finally land. If we make the grid very negative, it repels the electrons so effectively that none reach the plate. For small voltage changes from the average or "bias" voltage of the grid, increasing the grid voltage makes more electrons flow to the plate and decreasing the grid voltage makes fewer electrons flow to the plate. The measure of the effectiveness of this control action is the *transconductance* of the vacuum tube, which is measured in micromhos or millionths of a mho. Actually, the transconductance is just the change in plate current per unit change in grid voltage under a fancy name. A good vacuum tube may have a transconductance of 5,000 micromhos, and that means merely that for one volt change in grid voltage we get 5,000 millionths of an ampere change in plate current, or a change of .005 amperes.

Now, in the amplifier circuit shown in Figure 1a, this current flows through the resistance R. Suppose, for instance, that R is 1,000 ohms. Then, if we change

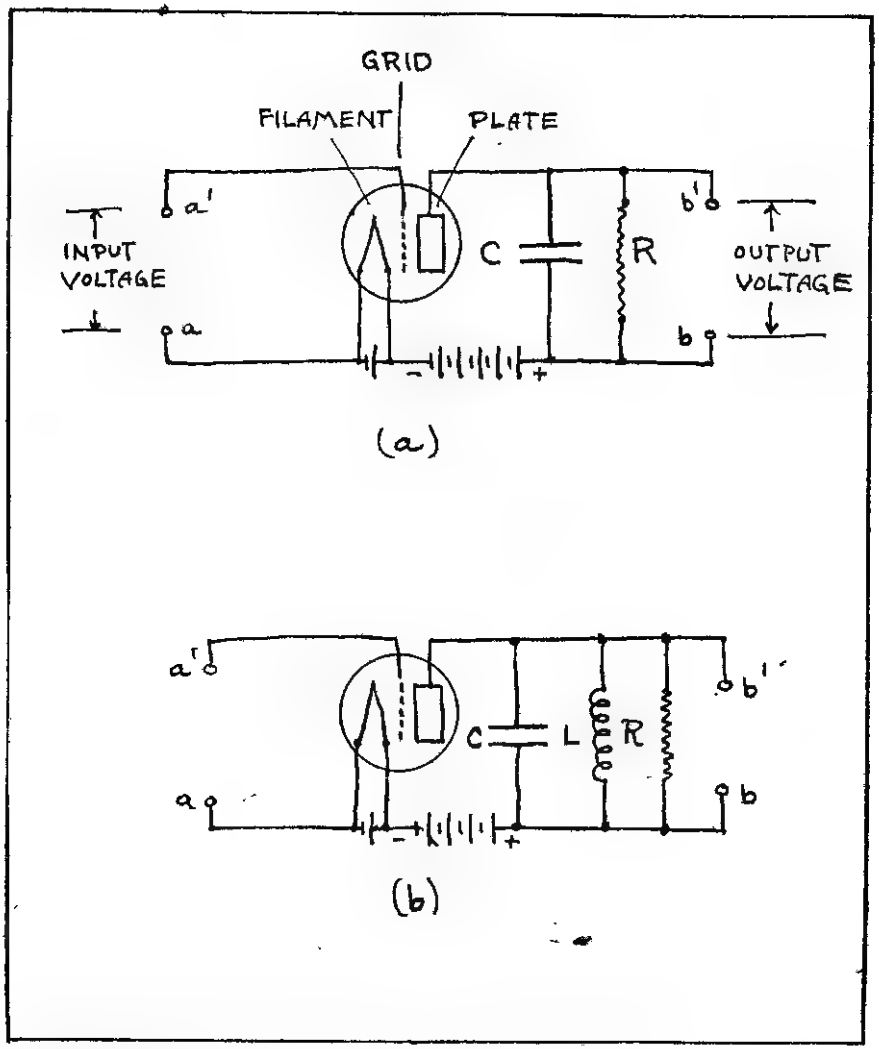


Figure 1: The shunting capacitances of tube elements and wiring act to reduce the bandwidth ordinary vacuum tubes can amplify effectively.

the voltage across the input terminals a-a′ by 1 volt, changing the plate current of the vacuum tube .005 amperes, by Ohm's law the change in the voltage drop across R must be the current multiplied by the resistance, that is, .005 times 1,000 or 5 volts. With a tube

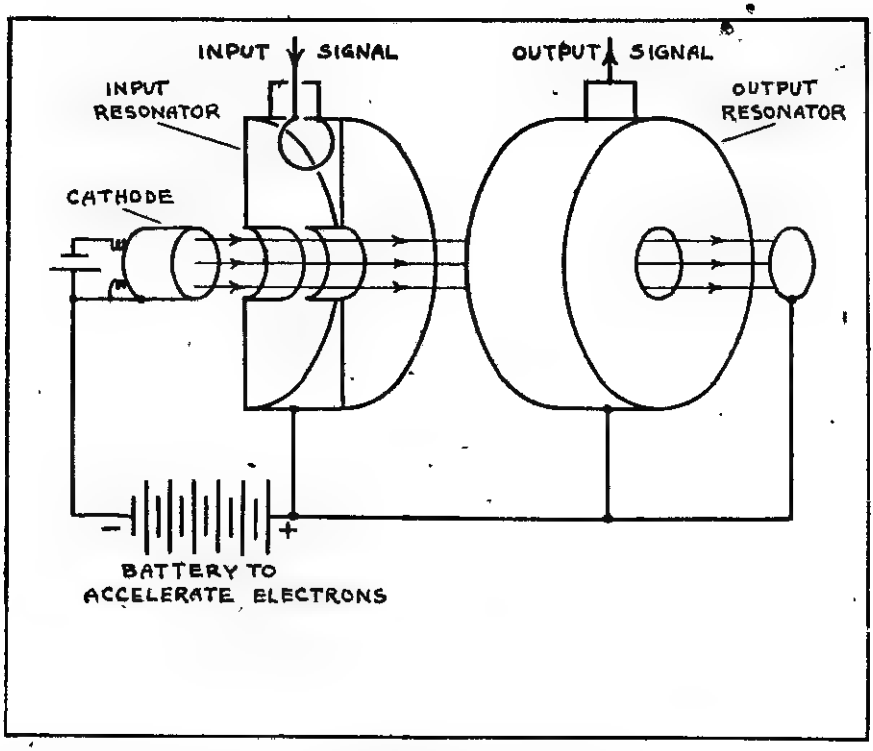


Figure 2: The klystron tube operates well into the microwave region, but suffers from the same bandwidth limitations that afflict ordinary tubes.

transconductance of 5,000 micromhos and a load resistance of 1,000 ohms, our one-stage amplifier gives a change in voltage between output terminals b-b′ of 5 volts for one volt change between the input terminals a-a′. We say that the amplifier has a voltage gain of five times, which is a pretty respectable gain.

So far we haven't said a word about frequency or bandwidth, and it might appear at a first glance that the circuit would amplify all frequencies right out to microwaves. What is wrong with the picture? The most serious thing wrong is that we haven't said anything about the capacity of the condenser formed by the plate and the other electrodes of the tube. This condenser has been represented symbolically and labeled C in Figure 1a.

A condenser is a sort of electric tank. To raise the voltage level one unit—one volt—we must supply C units of charge—C coulombs—where C is the capacity of the condenser—in farads. The farad is a

pretty big unit, and capacities in amplifier circuits are best measured in micro-microfarads—millionths of a millionth of a farad. In a multi-stage amplifier the capacity C appearing across the output of a tube may be about 20 micro-micro-farads. This is partly the plate capacity of the tube, partly the grid capacity of the next tube, and partly wiring. This means that in order to change the voltage between b and b' by five volts we must supply to the condenser five times twenty divided by a million million coulombs, or .1 billionths of a coulomb.

This certainly seems a pretty small charge to give us any trouble. Suppose, however, that the input voltage we are trying to amplify has a frequency of 10 megacycles, that is, that it changes from most positive to most negative and back to most positive again in one ten millionth of a second. This gives it only a half of a ten millionth of a second to change from most positive to most negative. We have said that for the tube we are talking about, one volt change at the input causes a change of .005 amperes in the plate current. The current is just the rate of flow of charge, so in one half cycle—from most positive to most negative—the total flow of charge in the plate circuit will be .005 times ½ divided by 10,000,000, or .25 billionths of a coulomb. *If* all of this went into the condenser C it would be more than the .1 billionth of a coulomb necessary to change the voltage across the condenser by 5 volts; in fact, it would change the voltage by 12.5 volts. *But*, not all of the current does flow into the condenser, and, in fact, in calculating the gain we assumed that all of the current flowed through the resistance.

In any event, you can see that around a frequency of 10 megacycles we are getting into trouble in supplying, during the brief time between when the grid is most positive and when the grid is most negative, enough charge to change the voltage across the condenser by the desired amount. Actual calculations concerning the gain of amplifiers at high frequencies are made a little differently, in terms of the impedance of the circuit formed by the condenser C and the resistance R. The impedance is the quantity by which we multiply an alternating current to get the alternating voltage, just as we multiply a direct current by the resistance to get the voltage. A calculation shows that at a frequency of 10 megacycles the impedance of the resistance-condenser output circuit we have been talking about is only 620 ohms, compared with the impedance at low frequencies—which is equal to the resistance—of 1,000 ohms. This means that the voltage gain of our one-stage amplifier will have fallen from its low-frequency value of 5 times to 3.1 times at a frequency of 10 megacycles, and at higher frequencies the gain will be even less.

What can we do about it? We can, of course, make the resistance R smaller, so that the plate voltage

doesn't change so much and we don't have to supply so much charge to the condenser. This, however, obviously cuts down the gain of the amplifier. We could recoup this loss by increasing the transconductance of the tube, that is, by making a tube that gave more change in plate current for each volt change in grid voltage—if we could make such a tube. That's one thing the electronics experts have worked hard on. Or, if the condenser C had less capacity—. But that condenser pretty much goes with the tube, too. It's mainly the plate capacity plus the grid capacity of the next tube. Electronics experts have been sweating over that. Maybe we will have better tubes, with greater transconductance and lower capacity, in the future. Still, it's a long way from 10 megacycles to 800 megacycles, and it's almost obvious that the Bell Laboratories men didn't do it that way.

How general is the sort of limitation we have been talking about? We might consider a radio-frequency amplifier, as shown in Figure 1b. Here the condenser C has been shunted by an inductance (coil) L. Such a combination has a very high impedance near a certain frequency to which it is *tuned*. Near that frequency the impedance of the circuit formed by C, L and R is just the resistance R, and we get the same gain we would get at low frequencies with the circuit of Figure 1a. However, at frequencies away from this frequency, the condenser gets in its dirty lick, and we actually find that the total *bandwidth* of the radio-frequency amplifier of 1b is the same as the bandwidth of the audio amplifier of 1a—if the tube transconductance, and C and R are the same. No matter what frequency we amplify at, we are faced with the same problem.

Is this really true? Suppose we go to microwave frequencies, and don't use triodes, or tetrodes, or pentodes, but use a klystron amplifier instead. Figure 2 shows the chief parts of a klystron amplifier; the vacuum-tight envelope which encloses the cathode and the path of the electron beam is not shown. In the klystron, an electron beam is drawn from the cathode by a positive accelerating voltage. This electron beam is shot in succession through two high-frequency "resonators." In Figure 2 the input resonator is shown cut in half. The resonators are hollow metal structures shaped much like pillboxes. At the center, short sections of metal tubing stick in toward one another, the ends separated by a short gap. When an input signal of the frequency to which the resonator is tuned is coupled into the input resonator by a loop of wire, a high radio-frequency voltage appears across this central gap.

The voltage across the central gap, alternately positive and negative, alternately speeds up and slows down the electrons forming the electron beam as they cross the gap. Thus, if electrons at one instant are slowed down by the signal volt-

Figure 3: Bell Telephone Laboratories traveling wave tube extends the duration of interaction between electric wave and electron stream in both time and space so it can amplify a wider band.

age, electrons crossing the gap a half cycle later will be speeded up. Then, as the electrons travel toward the output resonator, the fast electrons, which left the gap later, tend to catch up with the slower electrons, which left earlier. Thus, the signal voltage tends to make the electrons pass through the output resonator in bunches. These bunches constitute an a-c output current which for small signals, is proportional to the signal voltage across the input resonator. Thus, the klystron has a property much like the triode; the a-c output current is proportional to the input voltage, and the constant of proportionality is exactly analogous to the transconductance of the triode.

What about the capacity of the tube? The input and output resonators do have capacity, just as the triode plate and grid do, the capacities appearing between the faces of the resonators and the short protruding tubes at the center. Thus, the amplification and bandwidth of the klystron can be expressed in terms of transconductance and capacity, just as in more conventional tubes, and the same sort of limitations apply. The chief difference is that for a given gain the klystron won't give quite as much bandwidth as, say, a good pentode will at lower frequencies.

We see that for two quite different sorts of vacuum tube a high gain can be achieved only with a narrow bandwidth, or, conversely, a broad bandwidth can be achieved only by reducing the gain. Further, if we broaden the band more and more, finally the gain becomes unity and the "amplifier" is completely ineffective. As a matter of fact, any tube in which the electrons are acted on over a short distance only have this limitation. A good gain can be achieved only by using high impedance input and output circuits which give high voltages to act on the beam. These high impedance circuits will, because of the capacity across them, have a high impedance over a narrow frequency range only.

How can we get more bandwidth? It's the high impedance circuits, needed to give high voltages to act on the electrons, that cause us the trouble. Couldn't we perhaps do with low voltages? If we let the electric field caused by the input signal act on the electrons for a long time, perhaps we could get as much effect from the weak field of a low-impedance circuit as we get from the strong field of a high-impedance circuit acting for a short distance only.

The idea of letting a weak field act on the electron stream over a long distance has been haunting electronics engineers ever since the early thirties. How was this to be done? That part came fairly easily. One was to use some sort of transmission line down which the radio wave would travel slowly compared with the speed of light, so that electrons accelerated by a reasonable voltage could keep up with the wave. Then, we could have an electron, so to speak, skimming along with the wave like a man on a surfboard rather than cutting through

it like a man on a speed boat. The idea of a slowly traveling electric field and a stream of electrons keeping pace with it isn't particularly new. Somehow, though, the earlier workers got stuck at this point, and bogged down in the complications of trying to combine this wave sort of operation with features of more conventional tubes.

During the war an unprejudiced young worker, R. Kompfner, at the Clarendon Laboratory in Oxford, England, threw out all the complications and showed that one could get gain with the simplest combination of transmission-line type of traveling wave circuit and electron stream imaginable. Now, the Bell Telephone Laboratories has announced a tube with unprecedented gain and bandwidth, which Dr. J. R. Pierce, one of the inventors, is holding in Figure 3. If you want to know what's in the tube, though, and how it operates, you'd better look at the schematic drawing in Figure 4.

Here we see to the left the electron-emitting cathode and the positive gun anode for accelerating the electrons. The electrons are accelerated from the hot cathode by the high voltage—1,700 volts—applied to this electrode and shoot down the axis of the tube in a narrow beam, focused and guided by magnetic fields. The magnetic fields are produced by coils not shown in Figure 4.

Surrounding the electron beam for nearly a foot of its length down the tube there is a closely wound helix of wire which guides the radio wave. This wave, consisting of electric and magnetic fields, tends to follow the wire with the speed of light. As the wire is roughly 13 times as long as the wound spiral, the wave travels down the helix at about 1/13 the speed of light. The electron stream travels through the helix a little faster than the wave.

Now, it is true that the helix down which the wave travels has capacity and inductance, but these are distributed all along it in such a way that it acts quite differently from the "lumped" capacity and inductance of the triode amplifier in Figure 1b, or the capacity and inductance of the klystron resonators of Figure 2. The helix of Figure 4 is a "transmission line" type of circuit, and waves of widely differing frequencies can travel down it in much the same manner. Thus, as far as the helix of the traveling wave tube goes, it's good for a very wide band of frequencies, and has none of the limitations of the circuits of Figures 1a and 2. Of course, it doesn't give as high a voltage or field as these circuits.

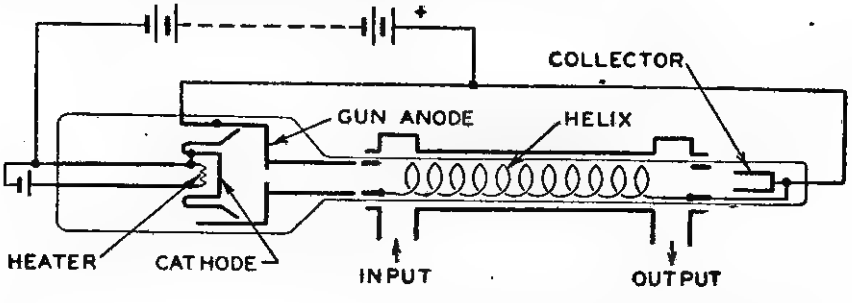
The electric field of the helix *is* weak, but, on the other hand, it interacts with the electrons all along the helix. In a klystron, the electrons may be in the field of the input resonator for a tenth of an inch and then in the field of the output resonator for another tenth of an inch, and that's all the chance the electrons get at the field or the field at the electrons. In the traveling wave tube, each electron

is in the field for about eleven inches, and that makes a lot of difference.

We've mentioned that the tube does have *some* bandwidth limitation. It appears that at the present this isn't in the tube at all, but in getting the signal onto the helix at the input end or off of the helix at the output end. The radio signal is brought to the tube in a wave guide, a rectangular metal tube which can carry microwave radio waves much as a speaking tube transmits sound. The end of the helix passes through the input wave guide and is so shaped that the radio wave jumps right through the glass onto the end of the helix, which acts as a sort of antenna, and flows on down the helix. A similar connection is made between the other end of the helix and the output wave guide. This is indicated in Figure 4. However, the ingenious connections between the input and output wave guides and the helix are not nice smooth circuits as are the wave guides and helix: they partake somewhat of the nature of the lumped circuits which limit the bandwidth of pentode and klystron amplifiers, although they are much broader band. It is these input and output circuits which limit the bandwidth to about 800 megacycles, and if they could be improved the tube would presumably work over an even wider bandwidth.

All the important parts of the traveling wave tube have now been described, and it might be well to look at the tube in its circuit—a complete traveling amplifier—which is shown in Figure 5. Besides the tube and the two wave guide connections, we see the two coils which are required to guide the beam down the tube. The narrow coil just to the left of the input wave guide in

Figure 4: This schematic diagram shows the engineer one of the fundamental differences between the traveling wave tube and other types. Interaction between electron stream and radio wave occurs over about 11 inches of space instead of about 0.1 inch, as in a typical triode vacuum tube.



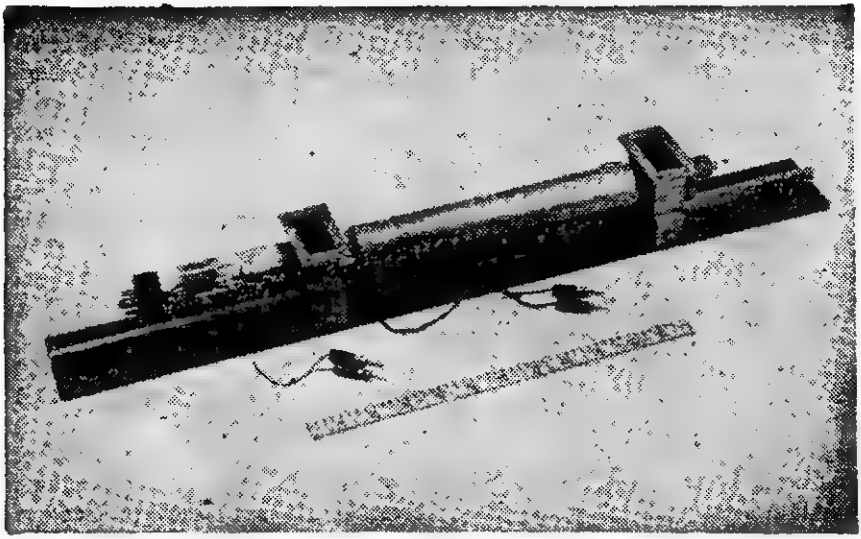


Figure 5: The traveling wave tube in its work clothes looks like this. Rectangular openings are for coupling to input and output wave guides.

Figure 5 provides an adjustment of the beam just before it enters the helix, and the long coil covering the tube between the two wave guides keeps the beam from spreading in its passage through the helix.

With this picture of the tube and its parts in mind, I suppose that the reader wants to know just how it is that the tube amplifies the wave traveling down the helix. This question can be tackled in varying degrees of detail. One can handle the problem mathematically and get some really quantitative answers, but the going is pretty tough. Or, one can give a general picture of the operation by saying that the electrons flow past the wave much as a wind blows past ripples on a stream, making them bigger as they travel along. This picture is really a pretty close mechanical analogy to the interaction of the electrons and the field in a general way, though it breaks down if examined too closely.

What is needed is perhaps something in between, and Dr. J. R. Pierce and Dr. L. M. Field, who described the Bell Laboratories tube at an Institute of Radio Engineers meeting held at Yale last June gave just such a picture. They say that the part of the radio wave going down the helix which really does the business is the electric field along the axis of the helix, which acts at some points to slow the electrons down at other points to speed them up. If we could travel down the helix at the same speed as the wave, what we would see ahead and be-

hind would be, then, evenly spaced regions of alternately accelerating and retarding field. If this doesn't seem concrete enough, we can in our thinking replace the field by a series of hills and valleys, as shown in Figure 6, and the electrons by frictionless balls rolling on these hills. In operation, the electrons move a little faster than the wave, so in Figure 6 we can imagine the balls rolling to the right, past the wave with which we are moving. Too, since the tube amplifies, the wave will be a little bigger to the right than to the left, but this isn't very important in our argument.

As we move with the wave, then, we see the balls roll to the right, alternately rolling up hill—in a retarding part of the electric field—and then down hill—in an accelerating part of the electric field. Now, if the electric field—say, the height of the hills—remained constant, not changing with time, the electrons would lose just as much energy going up the up slopes as they gained rolling down the down slopes. They would go fastest at the bottom of the valleys and slowest at the peak. Where they went slowest, they would be closest together; that is, the electrons would be "bunched together" at the top of the hills.

Suppose, however, that the wave gets larger as it travels along, as in fact it does. Then, moving with the wave, we see the hills of Figure 6 get higher and the valleys get deeper with time. What does this do? Well, consider an electron rolling down from A and up again to the same height at B. If the wave weren't increasing, it would be going the same speed at B as at A. However, as the wave is increasing, the electron rolls from A down a small slope and then up a steeper slope to get to B, for the valley is getting deeper all the time the electron rolls along. Thus, the electron is going *slower* at B than at A. Similarly, in rolling from B to A′ the electron rolls up a slope and then down a steeper slope, the hill having got higher between the time the electron rolls up and the time it rolls down. Thus, electrons go *faster* at A′ than at B.

We see that if the wave increases as it travels along the helix, and if the electrons roll past it, moving faster than the wave, the general rule is that the electrons go *slow* on the up slopes—regions of retarding field—and are hence bunched *close together* in the regions of retarding field, while the electrons go *fast* on the down slopes—regions of accelerating field—and hence are *dispersed* in the regions of accelerating field. This means that all along the helix at any time there are always more electrons in the regions of retarding field, losing energy, than there are electrons in the regions of accelerating field, gaining energy. Hence, there is a net transfer of energy from the electrons to the wave along the helix. As the wave gets stronger, the electrons become more strongly bunched, and as a result the strength of the wave increases exponentially with distance along the helix. The longer the tube is made, the greater the gain. Presumably there are

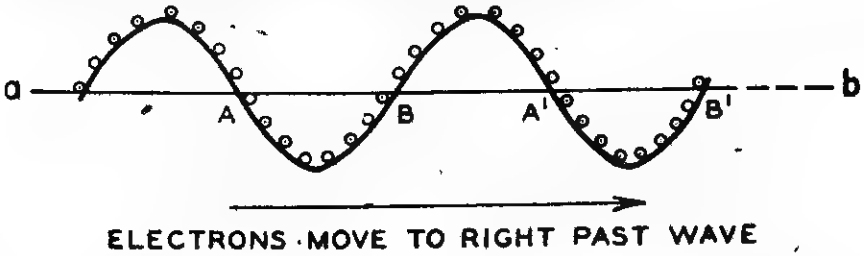
practical limitations which make very long tubes ineffective. However, some tubes have had a power gain of two hundred times.

It seems that the new tube not only gives a very great deal more bandwidth and a good deal more gain at microwave frequencies than does the klystron, for instance, but is really a lot simpler as well. Just what is it going to do? Will it make your television or FM set obsolete? Probably the answer to this question is no, not in the near future. As we've seen, you can't use it in George Smith's matter transmitter. Where are we likely to see it first?

General Electric has talked about microwave stations to relay television programs for one city to another. Western Union has announced plans for a microwave telegraph system to cover the country. The American Telephone & Telegraph Company is installing an experimental microwave radio relay system for television and telephone between New York and Boston. All of these systems are to use sharply focused beams of microwaves, beams which remain narrow and strong as far as there is an unobstructed path, but which can't get over the horizon. Thus, there has to be a receiver and transmitter about every thirty miles. Not a great deal of power is needed for the transmitter, because the highly directive transmitting antennas don't spread the power broadcast, but economically shoot toward the receiver, where equally directive antennas of large area are used to intercept as much energy as is practical. Now, the highest power that has been mentioned in connection with the Bell Laboratories' new tube is three watts, and this sounds as if it might be all right for such microwave relay systems. Thus, we might expect the new tube to be used in such microwave relay systems.

What would it send over the systems? We've said that to make full use of its capacities as far as bandwidth goes, we'd have to lump together maybe 53,000 audio chan-

Figure 6: The diagram shows how the electron density varies at different points in the electric wave. The points marked B are at maximum and those marked A are at minimum electron density.



nels each 15,000 cycles wide, or, with broad band FM, 5,300 such channels. The question is, can the systems engineers do it? There's always a chance that if you send 5,000 conversations through one amplifier you won't be able to unscramble them effectively at the other end. Theoretically, you can send each conversation on a different frequency band, and all you need to separate them is filters. Practically, frequencies have a way of getting mixed up when they are amplified. Non-linearities cause the frequencies to beat together, producing various sum and differences. This mixes up the information as it is being amplified. There's a good chance that if an engineer tried right now to design such a 5,000 channel system, without thinking it over a long time, and making a lot of experiments and measurements and even a lot of inventions, the listener would get 1/5,000 of each conversation he didn't want to hear and not much of the one he was after. It's likely, in other words, that the rest of the art will have to catch up before the tube can be fully utilized. This applies to sending lots of television programs through one tube as well.

Does this mean that the tube has to wait on future developments to be of practical value? That isn't quite right, either. For instance, it will do the klystron's job better than the klystron, giving more gain even where bandwidth isn't so important. Then, in using tubes such as the klystron, engineers have been struggling for, not 800 megacycles bandwidth, but just a little more bandwidth with the same gain. Now they have more bandwidth than they need; they just don't have to worry about bandwidth any more, and they have more gain as well. Perhaps the tube will be used first of all to make things easier rather than to do anything startling or new.

But the new things will come later, and soon. Nobody is going to let bandwidth lie around unused. We'll have something big. Maybe it will be 10,000 telephone conversations sent through one amplifier, or 50,000, for that matter. Maybe it will be 100 television programs or 5,250 line television instead of 525 line as now. There's just about enough room for that. It's quite possible and likely that it will be some use not yet thought of or seriously proposed. Often ideas for such uses are considered and discarded because there is no practical way to accomplish the desired result.

But bandwidth is a door which formerly was merely ajar and now has swung wide enough to permit many things to pass which previously had to be left outside. Since the total of discrete items of datum which can be passed through any system in unit time *is* a function of the width of the frequency band the system will pass without discrimination, it is obvious that pushing the bandwidth door farther open is another step, and an important one, in man's struggle to understand and control his environment.

THE END.

We haven't got there just yet—but maybe if we figure the thing out beforehand, we can set up a Martian colony with a sensible calendar, instead of winding up with a "jest growed" hodgepodge such as Earth's present job!

CALENDAR FOR MARS

BY R. S. RICHARDSON

Xix, the Martian Zygote, scanned the message eagerly.

"And so the date of invasion is set at last!" he cried, in hoarse guttural accents.

"So it would appear," the chief gymnosperm replied. He consulted the pages of the perpetual loose-leaf calendar reposing upon the top of his coelostat. "Our troops will start for Terra on Friday the 42nd, of the third autumnal period."

The preceding remarks are a bit on the irrational side except for the last statement. Incredible as it may seem, from a distance of 40,000,000 miles we can devise a calendar for Mars that is much superior to our own. Our terrestrial calendar has been patched and repatched through the centuries as one generation after another strove to keep the dates in step with the seasons. In addition, so much sentiment and tradition have become attached to the calendar that the prospect of adopting a perpetual simplified form is pretty slim. But in planning for Mars we can start with a clean slate.

It is interesting to note that Earth and Mars are the only planets for which a calendar is needed. Mercury and probably Venus have a day equal in length to the year. Jupiter and Saturn rotate at different rates in different latitudes. Uranus, Neptune, and Pluto are so far from the Sun that time must be of little concern on those lonely worlds. But a calendar would certainly be as necessary on Mars as on Earth. And since we know the length of the Martian day and year

with a high degree of accuracy, it is entirely possible to construct a calendar good not merely for a year at a time but perpetually—one that could be used for ten thousand years without requiring correction.

The following calendar scheme is one designed by Dr. Robert G. Aitken, Director Emeritus of the Lick Observatory, Mount Hamilton, California. It is a splendid example of rational calendar planning. After studying it carefully maybe you would like to try your hand at making one, too. For it is only one of many that might be suitable for the Red Planet.

The chief source of trouble in any calendar scheme is the fact that there are not an exact number of days in the so-called tropical year, or year of the seasons. Take our present calendar, for instance. If Earth made a revolution around the Sun once in exactly 365 days there would be no problem at all. The difficulty lies in the fact that one revolution requires about 365.25 days, so that if we call the year 365 days we would be losing one-quarter of a day per annum. The result would be to make the seasons gradually work through the months. Eventually the words of the popular song would come true and we would be having June in January, not figuratively but literally.

In Roman times the calendar was regulated by the priesthood and got so confused that as Voltaire remarked, "The Roman generals always triumphed, but they didn't know on what day they triumphed!" To bring order out of this chronological chaos, Julius Caesar acting upon the advice of the astronomer Sosigenes decreed that henceforth there should be three years of 365 days followed by one of 366 days known as a *leap* year. This system of reckoning is known as the Julian calendar and went into effect in 45 B. C.

The Julian calendar relieved the symptoms without actually correcting them. For the length of the tropical year is not exactly 365.25 days, but falls short of it by 11 minutes and 14.0 seconds. This might seem to be cutting it pretty fine and for many years the Julian calendar was satisfactory. But after 400 years it was off by 3 days, and by 1582 A.D. spring was coming on March 11th instead of March 21st. A new reform was urgently needed.

This time the distinguished astronomer Clavius recommended that in the future only such century years as are evenly divisible by 400 should be leap years. Thus 1600 and 2000 are leap years but 1700, 1800, and 1900 are not. The reform was inaugurated by Pope Gregory and constitutes the Gregorian calendar. That calendar on the wall in front of you with the girl in the bathing suit above it is a Gregorian calendar.

But even the Gregorian calendar is not perfect but will be in error by a day in the year 4782 A. D.

Mars makes one rotation on its axis in 24 hours 37 minutes and 22.58 seconds of terrestrial time, and makes one revolution around

the Sun in 686.9797 terrestrial days. But naturally on Mars we would hardly measure the day and year in terrestrial units any more than we would think of using Arean units on Earth. Translated into Martian time, therefore, the calendar consists of 686.600 Martian days of 24 Martian hours each.

The question now arises: how to deal with this odd 0.600 part of a day?

We can think of several schemes at once. Five Martian years contain 5×686.600 or 3343 days exactly. We might have four years of 669 days followed by one of 667 days. Or four years of 668 days followed by one of 671 days. Both of these, however, would seem inferior to the following:

Suppose we have the years run alternately 668 and 669 days each. This would mean that the first year we would lose 6/10 of a day and the second year gain 4/10 of a day, so that in two years we would be out by 2/10 of a day. In ten years we would be short by five times this amount or one entire day. Consequently, leap year on Mars would come every ten years instead of every four as on Earth. With this scheme we can make the Martian dates agree with the seasons for ten thousand years.

The sensible thing to do on Earth would be to make January 1st come on the day the Sun crosses the equator from south to north called the vernal equinox when spring begins in the northern hemisphere. So let us without hesitation start the arean year when the spring begins in the northern hemisphere of Mars. Then divide the year into four quarters and insert an extra decennial day between the second and third quarters, in this way:

Days in	Spring	Summer	Autumn	Winter	Total
Odd years	167	167	167	167	668
Even years	167	167	167	168	669
Decennial years	167	167 (1)	167	168	670

On Earth the month arose in connection with the period of 29½ days from new moon to new moon. Phobos and Deimos have given Mars a lot of publicity but they are not very well adapted for calendar purposes. As it seems desirable to have one day in seven as a rest day, the different quarters could be broken up into periods of 41 and 42 days. We have no idea what these days would be called on Mars, but since we have to call them something, suppose we continue to use the old names familiar to us on Earth.

Now we are ready to form our perpetual Martian calendar—the calendar that will endure for $10 \times 10 \times 10 \times 10$ Martian years.

We make the first day of all *odd* numbered years begin on a *Sunday;* and the first day of all *even* numbered years begin on a *Wednesday.* The midyear day interpolated every ten years has no week day name. On this scheme the calendar is cyclical on a two-year basis.

PERPETUAL MARTIAN CALENDAR

ODD-NUMBERED YEARS

SPRING

I

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42

II

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42

III

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42

IV

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	

SUMMER

I

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	32	33	34	35	36
37	38	39	40	41	42	

II

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	32	33	34	35	36
37	38	39	40	41	42	

III

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	32	33	34	35	36
37	38	39	40	41	42	

IV

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	32	33	34	35	36
37	38	39	40	41		

AUTUMN

I

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	32	33	34	35	36	37
38	39	40	41	42		

II

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	32	33	34	35	36	37
38	39	40	41	42		

III

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	32	33	34	35	36	37
38	39	40	41	42		

IV

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	32	33	34	35	36	37
38	39	40	41			

WINTER

I

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
32	33	34	35	36	37	38
39	40	41	42			

II

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
32	33	34	35	36	37	38
39	40	41	42			

III

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
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★ MID YEAR DAY INSERT IN ALL YEARS WHOSE NUMBERS IS DIVISIBLE BY TEN----

In addition to being perpetual, this calendar has the advantage that the number of working days in each quarter are divided as evenly as possible, and any set holiday such as Christmas would always fall upon the same week day in the odd- and even-numbered years.

Dr. Aitken's calendar is a model of simplicity, easy to master and three times as accurate as our terrestrial method of calculating when taxes come due.

Now you can go ahead and figure out a calendar of your own for Mars. It is a fascinating pastime with plenty of opportunity for originality and imagination.

You, too, can become a World Planner!

THE END.

IN TIMES TO COME

The September issue of Science Fiction is going to have a number of interesting items to offer, but this column, for this time, is going to be devoted to art work primarily.

Item the first is Astounding's cover for September. It's different. It's unique. And it's more than good. It came about in the following way; Alejandro Canedo, who did our last cover, was in, and invited me to come up to his studio where he had some paintings he was about to ship to a showing. I did. And he had some strikingly beautiful, and wholly unique art work. I had never seen anything like it—and immediately demanded why he hadn't done one like *that* for Astounding.

It seems that Canedo doing what he likes, and Canedo doing what he thinks someone else wants are quite, quite different. I think you'll want a lot more of the type he's done. And I can't describe it.

Item the second concerns our sister magazine. *Air Trails and Science Frontier*. The August issue contains a full-page color photograph of MIT's cyclotron in action, and a brief article on cyclotrons. It's an unusually beautiful color shot. But the September *Air Trails* will carry three of four Chesley Bonestell paintings of the planets. The cover, and *Air Trails and Science Frontier's* two full-color pages will carry paintings of Jupiter, Venus and Mars. They're magnificent jobs; they'd fit Astounding Science Fiction perfectly except that the larger size makes them better in AT. They illustrate R. S. Richardson's article. "New Paths to New Planets."

The fourth picture—the Sun with Mercury in Transit—will be on our October cover. It would be a mistake to miss any of these four genuinely magnificent paintings.

THE EDITOR.

-BY MURRAY LEINSTER

PROPAGANDIST

***Buck** was a dog—a good pup, with no particular education in psychology, semantics, or propaganda techniques behind him. But nevertheless, he did a magnificent—though completely accidental—job!*

Illustrated by Timmins

You remember the Space Assassins, of course. They were that race of which no human being ever saw a living member, and escaped to tell about it afterward. You also remember the deadly, far-flung search that was made for their base, their home. They'd been sniping our ships for a long time. But then a squadron of their space fleet raided the Earth colony on Capella Three and without warning or provocation or alternative slaughtered every one of the colony's half million human population. Then the hunt for them began.

This is the story of one of the incidents of that hunt—and also it's the story of a dog named Buck.

Buck trailed his master sedately into the control room of the light cruiser *Kennessee*. He waited patiently until the skipper looked up from the electron telescope. Then Buck's master—Holden—

sat down with the sheaf of wave records he'd brought from the Communications Room. Buck blinked wisely at the skipper and lay down on the floor with an audible, loose-jointed thump. He put his nose between his paws and sighed heavily. But the sigh was not of unhappiness. Buck was a simple dog. He was friendly with everybody on the *Kennessee,* from the skipper himself to the lowliest mess boy, but his master and private deity was Junior lieutenant Holden. Whithersoever Holden went, there Buck went also—regulations permitting—and waited until Holden wanted to go somewhere else.

Now he lay on the foamite flooring. He heard his master's voice, and the skipper's in reply. They were concerned and uneasy. Buck dozed. Little, half-formed dreams ran through his slumber. Memory dreams, mostly, of himself racing gloriously through tall grass on the green fields of Earth, with Holden always somewhere near. The voices of the two men formed a half-heard background to his dozing.

The men were troubled. The *Kennessee* rode a comet's orbit through the solar system of Masa Gamma, her drive off and giving no sign of life. She was impersonating a barren visitor from the void, spying out the ground for what would be—if she was successful—the monstrous destruction of an entire race by planet-smasher guided missiles and the merciless weapons of an Earth fleet. The men did not like it. They'd hoped that some other ship would be the one to meet with success in its search. But they had their orders.

Some weeks back the ship had dropped from overdrive to less-than-light-speed far beyond the outermost of the Masa Gamma planets. She'd decelerated to an appropriate speed and course for a wanderer, and she'd begun her ride along a comet's path through the eleven-planet system. And almost immediately her receptors had picked up evidence of civilization here. Space-radio signals. They were unintelligible, of course, but they told that here was a civilization comparable to human culture on a technical basis. And that was what the *Kennessee,* with every other light ship of Earth's space navy, was hunting for. There was a race which, without known contact with Earthmen, was the deadly enemy of humanity. For years past, exploring ships from Earth had dropped out of sight with ominous frequency. There had been suspicions, but no proof of an inimical race which destroyed humans wherever it came upon them. But six months ago the Earth Colony on Capella Three had been wiped out, terribly, by raiders of whom nothing was known except that they were not human. So somewhere there was a race which held Earth to be its enemy. It had to be found. If it could not be negotiated with, it must be destroyed before it grew strong enough to wipe out all of humankind. And the men on the *Kennessee* knew that they might have found it on the planets of Masa Gamma. This system had

never been explored before, and this civilization which had space radio might be the one—

Buck, the dog, dozed lightly on the control room floor. Little fragments of dreams ran through his half-slumbering consciousness: The smells in the engine room; an irrelevant fragment of chasing a cat; a moment or two in which he sniffed elaborately at a tree—A slightly louder comment made him open his eyes.

"They've interplanetary travel, sir, at least"—that was Holden. "We've picked up space-radio messages from definitely between planets. It looks like this is the race we were sent to find."

The skipper nodded.

"It could be. But if they're to be smashed on our report we need to make sure. That's orders, too. Can they smash the *Kennessee?* That's the test for the enemy. If this race can't kill us, they're not the enemy we're looking for. If they can, they are. We've got to find out."

"But interplanetary travel is good evidence—"

"It's not interstellar travel," said the skipper. "We'll send a torp back immediately with all the data to date. But you've picked up no whango waves, Holden. We've no proof that these folk can travel between the stars. The enemy can."

"They might be concealing the fact," said Holden. "They'd have picked up our whango wave on arrival. They might be laying for us; waiting for us to walk into their parlor where they can smash us without a chance to fight back or report. That would be typical."

He stood up and Buck got immediately to his four paws and wagged his tail. His master, Holden, was going to go somewhere. So Buck was going with him. He waited contentedly. To Buck, happiness was going where Holden went; being wherever Holden was; simply soaking in the sensation of being with Holden. It was a very simple pleasure, but it was all he asked of fate or chance. When Holden petted him or played roughly with him, Buck was filled with ecstatic happiness, but now he waited contentedly enough simply to follow Holden.

"What you say is true enough," agreed the skipper. "They could be laying for us. We'll see. A message torp will make sure that if we don't get back our fleet will know where to come and who to smash. Then we'll make a landing in a lifeboat. Our enemy couldn't resist smashing that! And if it gets away, we'll know something about their weapons, anyhow—."

"I volunteer, sir, for the lifeboat," said Holden, quickly.

"We'll see," said the skipper. "You get your data ready for the torp. You're sure this record is a scanning beam? Like the old-fashioned radar? And it's being kept on us from this fourth planet?"

"Quite sure, sir," said Holden. "We can't know how detailed the information may be that it takes back. Of course, it would be logical enough to scan a supposed comet—"

"Let's hope," said the skipper,

twinkling, "that the echo from our hull says, 'Nobody out here but us comets, boss.' Get your stuff ready for half an hour from now, Holden."

Holden saluted and went out of the control room. Buck went sedately after him, a large brown dog who did not bother his head over such trivia as interstellar travel or nonhuman races who massacred half a million humans with an insensate ferocity.

Buck was a very contented dog. He was with his master.

The Planetary Council of Masa Four was in session. It was not a happy gathering. Scanning beams had reported that a supposed new comet, driving in on a perfectly convincing orbit, was actually an artifact—a spaceship. It used no drive and seemed empty of life. But it had come in through the gravitation field of the outermost planets—and it showed no sign of rotation. Which was impossible unless gyroscopes or some similar device were running within it.

"We have had one visitor from space, before," said the Moderator of the Planetary Council. He looked very weary. "Our histories tell us of the consequences. If this is another ship of the same race, we must destroy it. Since it is attempting secrecy, such action is justified, I think. But that secrecy suggests suspicion of us—a suspicion that we may have destroyed the last visitor. If we destroy this ship also, we may be sure that suspicion will become certainty and a third visit will be made in overwhelming force. That means that we will have to convert our whole civilization for war. We will have somehow to develop an interstellar drive, and we will have to spend the rest of the time in battle for our very survival. We will have to change from a peaceful race to one with a psychology adapted only to war."

The Spokesman for the First Continent said hopefully:

"Is it certain that this is a ship of the same race as the first? It is not of the same form. Is it certain that this race is of a not-possibly-friendly type, like the first?"

"It is not certain," said the Moderator tiredly. "The psychological factors implied in its outer design suggest a different race. But can we risk an attempt at peaceful contact? The crew of one ship would be at our mercy. Might they not pretend friendship in order to escape with information leading to our destruction? Could we trust the friendship of any race at all, which sent a single ship to spy?"

There was silence. Two centuries before another ship had entered the Masan system. Half a planet devastated; and millions upon millions of lives, had been the cost of the destruction of that one ship. But its destruction had been necessary. Its crew made no response to peaceful overtures. Wherever they landed they destroyed, ferociously, everything savoring of a rival civilization. Especially the inhabitants. They could not be treated with—only killed.

"If," said the Spokesman for the

Third Continent wistfully, "we could capture a single member of this spaceship's crew, we could make sure that friendship was hopeless. It is a pity we cannot make sure, before—"

"It is a great pity," said the Moderator bleakly. "To convert not only our civilization but our people to endless war, for all time, is the greatest of pities. But I do not think there is anything else to do. Will you vote upon preparations for the destruction of this ship?"

The vote was reluctant, but unanimous. For war.

The *Kennessee* sent off the torp from the aft communications room. It was not an impressive device, the torp, merely a cigar-shaped object some six feet long. After leaving the *Kennessee* it would drive away at thirty-five gravities' acceleration for fifteen minutes, and then go into overdrive—when it would cease to exist, as far as normal space was concerned. Its disappearance would be marked by the emission of a monstrous surge of energy—a "whango wave"—which could be detected at hundreds of millions of miles. Near home base it would come out of overdrive with the emission of another, similar wave. The second wave was useful. From Masa Gamma to the *Kennessee's* home base was some eighty light-years. A space-radio message transmitted by tight beam would reach home base only in time to be of interest to the crew's great-grandchildren. But the torp would arrive within days, its reappearance-wave would be picked up by a far-flung net of communications ships, and they would receive and forward the torp's automatically transmitted messages and later pick it up for the recovery of written data and physical specimens.

Buck was not allowed to be present at the launching. He was a large dog, and the aft communications room was in the tapering, slender tail of the *Kennessee*. It would be crowded. Holden ordered him out. And Buck was far too well assured, both of Holden's affection for him and of his own worth, to be sensitive about such a matter. He knew there were times when he couldn't be underfoot. But he also knew that he was welcome anywhere else on the ship. He went trotting sedately in search of inferior, but still human, company until his master could allow him around again.

He found crew members stocking a lifeboat for its special mission. He went companionably into the lifeboat with the working party. He wriggled into the control cubicle with the man sent to remove its records—and observed. Presently other men arrived, the work party left, and there were sundry heaving movements of the lifeboat. Buck blinked from where he lay more or less curled up on the floor. Stars shone in the lifeboat portholes. There was a glaring bright light. Unshielded sunshine from Masa Gamma came in a forward port and made a patch of incandes-

cence on the back wall. Junior lieutenant Maynard walked into the control cubicle and flipped the phone switch.

"Lifeboat in launching position, blister removed, ready to take off," he said briskly.

"All right," said Holden's voice from the speaker. It sounded gloomy. "Take off when the whango wave hits. It may jam their scanner and get you out of the beam unobserved. Luck."

Buck knew loud speakers. But also he knew his master's voice. He wagged his tail. It thumped. Maynard jerked his head around and yelled: "Buck! Here's Buck! Behind me!"

An instant's silence. Then Holden's voice, more gloomy still.

"No time to get him back on board. He'll have to go along. Sorry, Maynard."

"No harm," said Maynard cheerfully. "Maybe he'll mascot us. How much time?"

"Twenty seconds," said Holden's voice. "You have all the luck! I was high man for this job until you drew that ace!"

Maynard chuckled. The *Kennessee* rode into a very probably hostile solar system. If it was the home of the race that had been sniping off Earth-ships and had massacred the colonists of Capella Three, there was not much chance that the cruiser would ever get away again. But its junior officers had played a hand of stud poker for the privilege of making a dare-landing on the system's largest planet.

The speaker suddenly emitted a sound so savage and so loud that the diaphragm jangled musically only once, and then made strangled, rasping noises. That was the whango wave of the message torp. It was a blast of untuned and untunable radiation which would jam every receiver in range while it lasted.

There was a crushing feeling of weight. Buck slid back against the back-rest of the seat on which he now lay. He was pressed hard against the upholstery. He wriggled and panted. His eyes grew plaintive. Buck did not like acceleration. In fact, he did not like lifeboat travel. But he had his fill of it in the next eighteen hours, anyhow.

A message arrived at the hastily-improvised Department of War on Masa Four. The Department of War was being feverishly organized to co-ordinate every erg of energy in the entire solar system into synchrophased power beams which at a given moment would stab out from four planets at once—all of them on the same side of the local sun—and converge terribly upon the pseudo comet. There would be no material weapon for the ship's detectors to note in time for any maneuver of escape. This weapon would strike at the speed of light. An object in the focus of the combined beams would experience the temperature of the interior of a sun. It was unthinkable that any possible relay could operate before it was volatilized. The weapon was irresistible—as against a single ship. But the com-

putation of phase-relationships for the moving planetary projectors, so that the separate beams would reinforce instead of partially canceling each other, was a matter of terrifying complexity. This weapon could destroy one ship, of known course and speed, or one ship on the ground, if enough time could be had for calculations. But it would be useless against a fleet. Days or weeks were required for the adjustment of the multitude of beams for a hit on a predetermined spot. Against ships of changing course and speed, the weapon was useless.

A message arrived at the Department of War.

SMALL SPACE CRAFT DETACHED ITSELF FROM INVADING VESSEL AT INSTANT OF STRONG UNTUNED WAVE-DISTURBANCE. SMALL CRAFT MAKING GUIDED FLIGHT TOWARD PLANET FOUR. WILL LAND ON DARK SIDE NORTHERN AREA FIRST CONTINENT. REQUEST ORDERS.

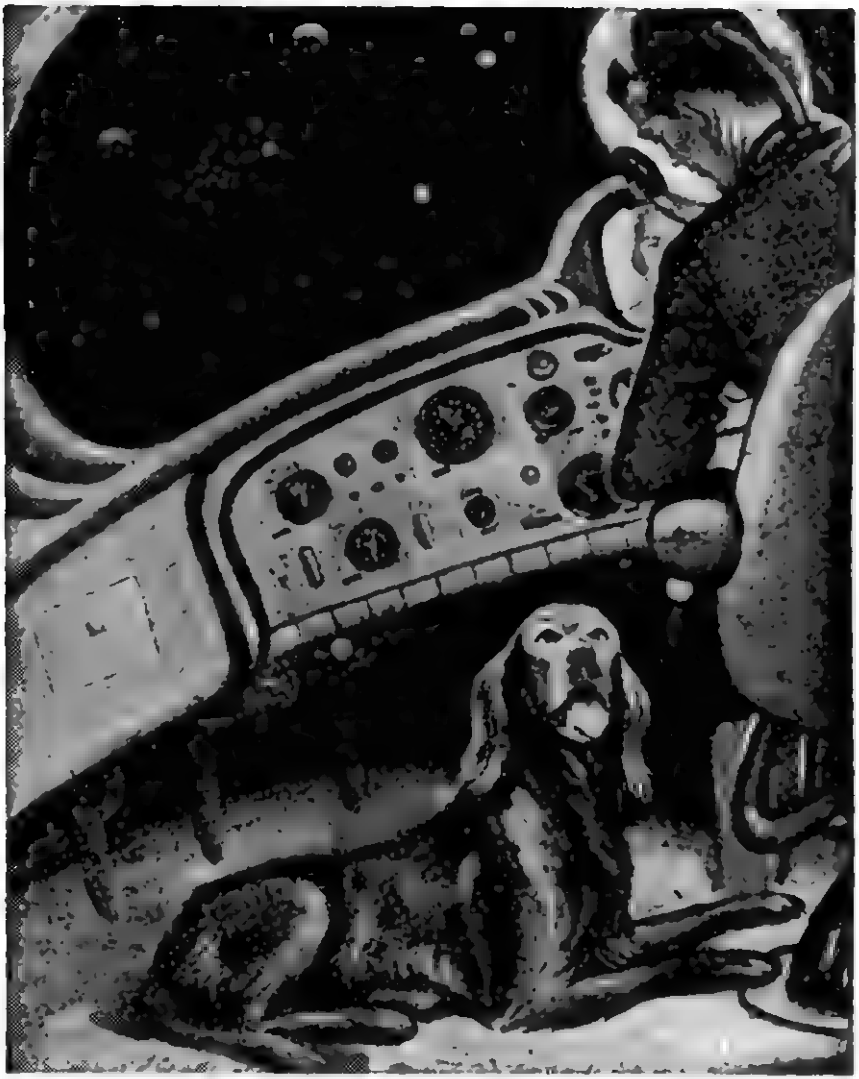
The Department of War was newly organized and had not time to acquire traditions of pomposity and bureaucratic delay. Within minutes its orders went back:

EVACUATE ALL POPULATION FROM AREA IN QUESTION. HAVE GROUND VEHICLES AND ATMOSPHERE FLIERS READY TO TEST OUT ARMAMENT OF CRAFT. BROADCAST APPEAL FOR VOLUNTEERS, GIVING DUE WARNING OF PROBABLE DEATH. NO SPACE CRAFT TO BE USED. NO HINT OF ADEQUATE DEFENSES MUST BE GIVEN TO ENEMY UNTIL FULL-SCALE OPERATION BY ENTIRE SYSTEM.

The population of the Masan had had one experience of invaders from beyond. Some twenty-five million citizens began a swift, orderly evacuation—as a precaution against the landing of an unarmed lifeboat.

Buck waked from an uneasy doze when the lifeboat descended to the planet's dark side. Every observation device known to men was at work to gather information, but Buck was not interested in technicalities. He yawned elaborately, even as scanner beams were noted. He stretched, as the scanner beams cut off abruptly. He shook himself comfortably as the analyzers reported the atmosphere to be Earth-type, with a considerable excess of the inert gases, but well inside the comfort range of oxygen-nitrogen mixtures.

The lifeboat went down carefully, feeling for dangers. Infrared equipment reported the shore of a sea, and oddities that could be the equipment of a harbor. Maynard sheered the tiny craft away. He actually neared ground only a hundred-odd miles away. It was his job to get himself killed if the local population could manage it, but it was not his job to make them. If they knew the seeming comet out in space was a spaceship, they'd be on the alert. If they were the race that had murdered the Capellan colonists, they'd try to keep him



from getting back to his ship. If they weren't—

The lifeboat grounded with infinite caution in what the scanners declared was a jungle of feathery-leaved vegetation. For long, long minutes Maynard sat tense, prepared to fling the little craft skyward on any sign of action against it. Nothing happened. The outside microphones transmitted noises, to be sure, but they were the random

sounds of wild life in a jungle. After a long time Maynard cracked a port. Still nothing.

"If anybody wants to volunteer to get biological specimens," said Maynard, "he can step out. In case of alarm, though, I'm going to take this boat up and try to wriggle back—to find out what they'll try to use to stop us."

Voices answered. There was the clanking of an unlocking door. Buck trotted back to it. Fascinating smells came in the opening. Men stepped out—armed and cautious. The exit door stayed open. One man stood by to shut and dog it if the lifeboat shot skyward.

It took courage for men to venture out, knowing that they might have to be abandoned so the lifeboat's mission of drawing enemy fire—if this race was inimical—could be carried out. But Buck was fascinated by the smells. He would have liked to get back to Holden, of course, but these men were his friends, too. If they went out into this place of innumerable novel smells—

He jumped lightly to the ground. His nose was instantly busy. The ground had a different smell from that of Earth. The plants were new. There were scents which must be animals, but not any animals Buck had ever scented before. He heard a man moving nearby, taking samples of vegetation. Very much could be inferred from the types of starch and cellulose this planet's vegetation contained. But Buck could have told much more, from what his nose discovered. Here a little carnivore had trailed a skittering small thing which periodically darted up into overhanging vegetation, and as periodically darted down again. There a small herbivore had made a vast, terrified leap for no apparent reason—which meant that a flying thing had made a swoop at it, and missed. And here a thing which had almost the smell of a snake moved in distinctive hops, while there was the definite smell of a warm-blooded animal in something which left a completely continuous trail by traveling on its belly.

Buck explored, utterly absorbed in this world of literally new smells. From time to time he heard the sounds made by the men, and was reassured. But he strayed farther and farther from the grounded lifeboat—only sometimes he stopped and listened to it—and he had found the burrow of some living creature and was sniffing absorbedly at its entrance when the really significant noises began.

One noise began at the horizon and swept toward the zenith. It was a dull, humming rumble, like the motors of atmosphere fliers Buck had heard back on Earth. It was mechanical, and, therefore, of man, and, therefore, not to be feared or suspected. At the same time there came distant clankings. And they were like bulldozers and other machines of men, and they were not to be feared, either. Buck sniffed fascinatedly at the burrow.

Men's voices called sharply. Had Holden called him, Buck would have gone bounding instantly. But

he owed a lesser obedience to other men. He sniffed again, and again, lingeringly. Then, as he trotted unhurriedly in response to the call, he heard the zooming roar of a lifeboat drive in atmosphere. It shot toward the sky. It did not occur to Buck that he might have had to be left behind—as a man would have been abandoned under like circmstances—because the lifeboat had to test out the deadliness of armaments on this planet, but had to be aloft to test them fully.

When he got back to the place where the lifeboat had been, though, it was gone.

Buck was simply bewildered. The droning above grew to a thunderous, circling roar. There were many flying things overhead, and they cruised back and forth in the darkness in a pattern which would have made it difficult indeed for the lifeboat to have escaped without coming under radar-aimed fire. At the same time, the clanking mechanical noises came closer from at least three directions.

Buck smelled incredulously at the place where the lifeboat had been, but where it was no longer. He ran uneasily along the scent trails left by the men who had gathered biological specimens. It was completely unthinkable that the men had deserted him. He came back again and again to the place where the lifeboat had rested. He was unhappy, of course, but it was not possible for him to imagine himself abandoned. He waited discomfortably for the men to notice that he'd been left behind and to come back after him.

Roarings circled in the overcast sky above him. Clankings approached in the encircling dark. Those were things of men—not his men, perhaps, but certainly men who would be friendly to a large brown well-mannered dog with a collar around his neck which said he belonged to Holden. They might even help him get back to Holden. But meantime he trotted uneasily about the place to which the lifeboat had not returned. The noises and clankings grew louder.

When the noises were very near, a blindingly bright, white light abruptly shone down from a low-flying plane which spun in dizzy tight circles overhead. The light showed everything with a pitiless clarity, and Buck blinked dazedly. But he was not alarmed. Machines and bright lights and flying things meant men. And a self-respecting dog has a perfectly comfortable relationship with all men, though it is a special relationship with the crew of his ship, and his tie to his master is unique.

Buck moved prudently out of the way as machines with glaring lights came clanking through the jungle, thrusting aside the feathery trees with a powerful violence. He moved out of their path, but he did not dodge into the shadows. He blinked, and wagged his tail abstractedly, and prepared to greet the men in the machines with due courtesy. Of course they would help him get back to Holden!

A machine stopped and some-

thing got out of it. But the figure was not a man. Buck sniffed incredulously. Then his hackles rose. It was not possible! Machines were handled by men! Only by men! The Masian moved toward him. Buck growled warningly. Unbearable light smote upon him. He growled again, bristling, a big brown dog growling in warning that members of a mere race which might have been sniping Earth-ships and massacring Earth colonies had better not bother him! Buck, of course, knew nothing of missing ships or massacres. He was a dog, a man's dog, and he could imagine no creature which was not inferior to man and which a man's dog could not reasonably defy.

It was an extraordinary picture. Alien and unlikely jungle trees rising toward an overcast sky in which a bright white light whirled in dizzying circles. Huge, gleaming machines with lights -very bright lights — stabbing through the jungle's feathery leafage and casting innumerable sharp shadows. The Masians, inhabitants of the fourth planet of Masa Gamma—not too much unlike men, to be sure—staring at a place in the jungle where a ship's lifeboat had landed, and where a big brown dog stood warningly at bay and growled at them of the wrath of his masters.

There was a pause. A race which has space radios, and interplanetary ships, and radar, is not likely to be altogether stupid. And there were scanners in the ground vehicles, too, which carried back everything the machines saw to record rooms. The best brains of the race watched this meeting. And perhaps it was back where the scanned picture of the event was seen that someone realized that Buck's paws were not made for the handling of machinery or the making of spaceships. Or perhaps something more subtle—

There were sounds which Buck somehow knew were language, though he could not understand them as words. He turned sedately from the first figure, which had halted at his growl. He blinked dignifiedly at the surrounding lights. None advanced toward him. Buck emitted sundry small, confident, admonitory rumblings. His men had been here. They had gone away. They would come back for him. Of course. He was going to wait for them. He was not arbitrary about it. He would allow the machines to pass as they pleased. Men probably wished the machines to do thus so, and he would not interfere. But he would wait here.

He deliberately turned himself around twice and lay down on the ground. But his head stayed erect, and he blinked at the lights. He calmly and confidently settled down for men to notice that he'd been left behind, and to come back for him.

But he hoped desperately that Holden would be with them.

A report went to the Department of War on Planet Four. It was a highly accurate report, covering the landing of a small space craft on the northern area of the First Continent. The footprints of men were

accurately transmitted, as well as the impression left by the space boat in the soil. There were motion pictures of Buck. Most of the report, naturally, was about him.

". . . Limited but definite intelligence," said the report. "Is aware of social relationships neither hostile nor friendly, but of tolerance. Is familiar with machines and regards them without fear but without interest. Has an extraordinary air of self-confidence and seems justified in opposing the wishes of more intelligent beings, though offering no hostility unless an attempt is made to force it to comply . . . Appears to be a member of a subject species to the makers of the space craft, though its utility is not clear, since it has neither prehensile claws nor any apparent technical aptitude for the supervision of machines . . . We are setting up psychoscanning devices to attempt to extract information from its memories, of course without its awareness of the process. Meanwhile we are making every effort to leave it emotionally undisturbed . . ."

A later report:

". . . Psychoscanners have been able to secure excellent pictures and sound memories from the animal. It is of a species which lives in symbiosis with the creatures operating the space craft. Its utility to the superior race is not yet clear, but its subservience to them—they are not much unlike us—is proven by the records forwarded with this report. The animal's vision appears to be comparatively poor, but its hearing and smell are excellent. Its memories of smells, in particular, are especially vivid. We have vision-memory records of various members of the spaceship's crew, but smell memories of every individual. Apparently, however, little or no technical information can be had from the animal because of the disinterest of the 'Buck'—this is the auditory memory of the animal's name for itself—in such matters. Memories of the naval base and of the presumed home planet of the invaders are concerned almost exclusively with smells. It is extremely concerned with trees and posts and the smells associated with them . . . We regret that no useful technical information can be had . . ."

An order from the Department of War:

"URGENT. FIRST ATTENTION. THIS ORDER SUPERSEDES ALL OTHERS WHATSOEVER AND CLAIMS THE OBEDIENCE OF EVERY CITIZEN BEFORE ANY OTHER ACTIVITY WHATEVER. The Planetary Council has decided that information obtained from the Buck will determine our attitude toward the invaders. The fullest data must be secured concerning the relative loyalty of superior and inferior. Subject races can be psychologically conditioned to loyalty to tyrannical superiors. To what extent was this done to the Buck, and how? To what extent are rights conceded to the inferior race? What punishments are inflicted for

mistakes of the race of inferior intelligence? What social stigma attaches to them? To what degree does the Buck expect loyalty to his kind from the superior race? What is the nature of the compact between the two—explicit or implied—and to what extent is it observed by the superior? What . . ."

The order continued in exhausting detail. It was based upon the realization that Buck—as a domestic animal—contained within his skull an absolutely objective picture of the human race. Buck would not be unbiased in his contemplation of his memories, but his memories would be right. A dog's-eye view of humanity would be, within its limits, an extraordinary revealing view.

The Planetary Council accepted the conclusion that no technical or military information could be had from Buck. But what information it could obtain would be priceless. No man could be truthful about his own race, talking to an alien entity. But a dog—

The Planetary Council pushed its preparations for war. It had very little hope of anything but never-ending battle through all the centuries of the future. But what hopes it had were centered in Buck.

Buck, himself, found life confusing. The place where the lifeboat had landed was fenced in, now, and he was inside the fence. The things which were not men treated him with respect, and he treated them with the self-respecting courtesy of a well-mannered dog. They pointed things at him, and he was bored. But presently they had a loud-speaker which made noises. Once it barked at him in exact similitude of another dog—in fact, Buck remembered a dog at the Rigel base whose bark had sounded exactly like that. He barked back, angrily. But the loud-speaker did not bark again. Another time, Holden's voice came out of it. And Buck leaped in frenzied joy, his tail wagging until it was almost a blur, and gave tongue in such howlings of heartbroken joy as a dog does give when his master returns after many days. When he realized that it was the loud-speaker he could not accept the disappointment. He went whimpering about the enclosure, searching for Holden.

There were other stimuli applied to Buck, too. One of the Masians brought him food. At first Buck sniffed at it gingerly. If he must eat of unfamiliar things, he preferred food of his own killing. But ultimately he tolerated the Masian and ate. The Masian had a loud-speaker attached to his body, and it said "Buck" on various occasions, and at first Buck's tail wagged joyously at the familiar syllable. But even when the Masian mastered the articulation of the name himself, Buck did not accept him fully. He wanted men. Especially, he wanted Holden. He dozed, and dreamed of Holden. He slept, and sometimes his dreams were such as to make his paws make tiny, jerking, frustrated movements, and sometimes he barked or whimpered or whined in his sleep. But the

whinings were of the desperate joy he felt when in his dreams he saw Holden.

He had no idea that the things pointed at him by the Masians made records of his memories as they were evoked by the increasing stock of stimuli the Masians were able to apply. Buck had understood the meaning of well over a hundred words, when combined with certain tones of voice. These words invariably provoked similar responses as the loud-speaker uttered them from the record of Buck's memories.

While the preparations for the destruction of the *Kennessee* went on, the Masians studied Buck intensively. With their increasing comprehension of his brain, they tried to win his friendship. The one Masian assigned to the task tried painstakingly to fill the part of Holden. He used the memory-recordings of Holden's voice. He tried to reproduce the strokings that Buck's memories said caused quiverings of ecstasy. Once, he tried to tussle with Buck as Holden did. And that took courage, because Buck was a big and powerful dog, and the Masian was slight and relatively frail.

But Buck would not play. He was polite, and he was amiable within the limits a dog sets for himself toward other animals also useful to man—horses for example, and cows and sheep and very occasionally a cat. But a dog will not play with a gamboling lamb nor run with a freed colt. Buck was reserved. His loyalty to man, and especially to Holden, could not be broken. And though he did eat, and condescendingly tolerated the Masian scientist—considered to have one of the two or three best brains in the system—who tried to replace Holden in his affections, he began to pine away as days and days passed by, and began to stretch into weeks. He began to grow thin, though he was abstractedly aware that the people who were not men had begun very definitely to like him.

After all, a man's dog doesn't thrive when he's separated from the man.

The *Kennessee* rode on in the orbit it had chosen. Maynard had made an unhappy, abject apology to Holden for the desertion of Buck, and Holden accepted it, and neither of them felt at all better afterward. A man would have been left behind under exactly the same circumstances, but a dog is somehow different. He can't take care of himself. His abandonment couldn't be helped, but it rankled.

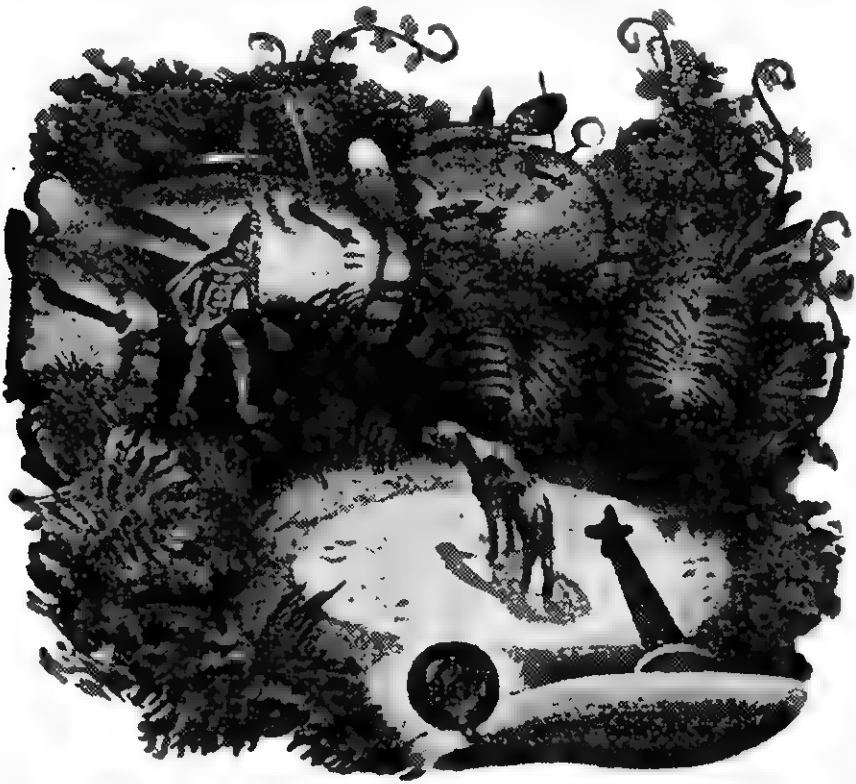
The material brought back from Masa Four was duly examined. The space-radio records piled up, and electron-telescope examination of the planets continued, and evidences of highly-developed civilization accumulated—while scanner-beam observation of the *Kennessee* from Masa Four went on unendingly.

It was a dubious situation extended almost to the breaking point. The lifeboat voyage had produced a reaction of ground vehicles and

atmosphere fliers. It gave an impression of limited offensive power. But on the other hand, there was interplanetary travel, here. And the scanner beam on the *Kennessee* and the instant detection of the lifeboat was proof that the people of this system knew exactly what the *Kennessee* was.

A civilization without defense weapons but with interplanetary ships and space radio should have tried to make contact with the *Kennessee*. If only to placate invaders, some attempt to open communication should have been made. Absence of such efforts was ominous. The appearance was that of a race which played possum until it could strike an overwhelming blow. So the *Kennessee* stayed in a state of nerve-racking alertness, with detectors out all around and relays set to throw on overdrive should a high-velocity guided missile seem to draw near.

"It looks bad," admitted the skipper to Holden. "We'd have tried to make contact, in their shoes. But whoever raided the Capella colony simply rode in and started killing. Maybe these people are that sort. Anyhow, if they do get us our fleet will know who did it



and come take them apart with planet-smasher bombs."

Holden said dourly:

"I wish I'd been in that lifeboat. When do we send back another message torp?"

"We make no more landings," said the skipper. He added, "You'd never be able to find where the other boat landed, and anyhow Buck—"

"Was probably blasted the instant they saw him," said Holden.

He couldn't blame anybody, but he was angry. He missed Buck.

On the twelfth day after Buck's landing, an interplanetary ship took off from Masa Four. The *Kennessee* had ridden in beyond that planet, now, and was headed for a perhelion point on the other side of Masa Gamma. If she survived to get there, it was the skipper's intention to put on overdrive and go back to base with all his records. But this interplanetary ship changed all plans. It appeared to be a rocket, in that it left behind a trailing cloud of vapor which looked like ejected gases. The spectroscopes, though, showed it to be merely hydrocarbon smoke particles. And it altogether lacked the backward velocity which would have proved it a means of propulsion. It was simply a trail of vapor, as if for advertisement.

In two days it had climbed well away from the planet and changed direction in a long smooth curve. The Navigation Officer came to the control room shortly after, to report that it was on an interception course, with interception speed, and would draw gradually closer to the *Kennessee* until contact was made. Then its trail of vapor broke, and swelled, and broke, and swelled, as if unmistakably to draw attention from the cruiser.

The control room loud-speaker boomed shortly. Holden's voice:

"Sir!" he said harshly. "That phony rocket is beaming signals at us, running up and down the spectrum and trying frequency and amplitude modulation and everything else. Listen!"

The speaker said resonantly: *"Woof!"* It was Buck's joyous bark. An instant later came the word "Buck" in a distorted but definitely recognizable version of Holden's own voice. And then, quite insanely, *"Lie down, sir!" "Come get it, boy!" "Fetch it, Buck"* and all the other phrases to which the dog Buck had been trained to respond. As a means of opening communication between alien and mutually suspicious races, the vocabulary known to a big brown dog named Buck lacked dignity, but nothing could have been much more informative.

"You see what it means, sir!" said Holden in a strained voice. "They got the stuff out of Buck's brain, somehow! They read his memories! They must have, somehow! They want to make contact!" Then he said thickly, "But if they killed him to rummage in his brain—"

"Mr. Holden," said the skipper, "answer them, please. Speak as if to Buck himself, and see what

happens."

In the speaker in the control room he heard Holden's voice as he spoke into another microphone.

"Buck!" said Holden hoarsely. "If you hear me, speak up, boy! Buck! Do you hear me?"

And then the loud-speaker bellowed with the joyous uproar with which Buck replied to his master. He barked and bayed and yelped and whined all at once, and then barked crazily like a creature gone quite mad with joy.

"He . . . he heard me, sir," said Holden unsteadily. "They didn't hurt him! I . . . I think, sir—"

"Quite so, Mr. Holden," said the skipper sedately. "I was about to order you to take a lifeboat and take another chance to learn something of these people. Suppose you go over and make contact with them? A race which knows a good dog when it sees one, and is honest enough to return him to his master, can't be the race that massacred half a million people on Capella Three!

The Masian scientist who'd tried to replace Holden in Buck's affections nevertheless grew rather friendly with Holden after the *Kennessee* landed on Masa Four. A message torp, send back to base, had explained the situation and the reason for friendly contact with the Masian civilization. Of course, if the *Kennessee* vanished, the Masians would be known to be definitely responsible, but that did not seem to bother them. And it did not bother the humans, either.

The Masian scientist explained to Holden:

"It has worked out very well. With your atomic power, you can put any amount of energy into the power beam we've showed you, for battle with our common enemy. It is odd that we made power beams to fuel our interplanetary ships because we didn't have atomic energy, and you made atomic energy because you didn't have power beams!"

"There'll be a lot of stuff that will fit together like that," said Holden. "Our civilization will mesh nicely, as long as we trust each other."

"Yes," said the Masian, somehow ruefully. "We intended to blast you to atoms, because you were afraid, and you intended to destroy our planets, because you were, also. I think both our races owe much to Buck."

"I still," said Holden uncomfortably, "can't see how you were able to trust us so completely. I don't think we'd have trusted strangers as you do us. Just because of Buck—"

"But it is because of Buck," said the Masian, wisely. "We could extract all of his memories. All of them. His kind adores men. He would accept any cruelty from you. But you are not cruel. He would give his life gladly, but no man would ask it. He is yours, unreservedly, but you do not accept from him without giving in return. Do you know when the policy of the Planetary Council, to trust men without limit, was finally decided?"

"Why . . . no," said Holden.

"When you entered the air lock of our ship," said the Masian, smiling, "and Buck met you. He had told us every secret he could impart. He had been almost a traitor, without knowing it. He had told us everything he knew of men. But when you entered our ship he leaped joyfully at you and you rolled on the floor together,—you hugged him! You did not think of possible harm he had done. You were as glad to see him as he was to see you. That was when our policy was decided. Then we knew that men will always repay trust with loyalty." Then the Masian added. "That is, most men."

Holden said uncomfortably:

"Well—That's something that has worried the skipper. You people act as if all of us were as decent as our dogs think us. We aren't. You'll have to be . . . well . . . a little cagey, sometime . . ."

"So," said the Masian, "we learned from Buck. But also we learned that there will always be men to trust."

Buck came dashing madly up the dark-green lawn. Holden and the Masian scientist sat on a sort of terrace of the Masian's home. Buck came racing up, panting happily, and thrust his muzzle into Holden's hand. He gave the Masian a brief tail-wag, and went dashing off again.

"That," said the Masian, "is something that he would never do to me, though I . . . yes . . . I think I like him as much as you do."

"That's because he's my dog," said Holden. "But he treats you like a man. Didn't you notice?"

"True! I had not realized! But it is true! Listen! We must have dogs, we Masians! Dogs to like us as they like men! And then no man who likes dogs can ever distrust a Masian who like them also, and no Masian—" The Masian laughed. "We could not despise a man an honest dog had for a master! Our two races will be brothers!"

That is all of the story about this one part of the hunt for the Space Assassins. Everybody knows that their home system was found, and everybody knows that when we tried to open negotiations with them their ships attacked us in a raging ferocity, and that there was no possible end to it but the extermination of men—and Masians—or of the Assassins. The battle was the first that was ever fought with power beams in Earth ships with Masian gunners. That's history that everybody knows.

But not everybody knows that there is a statue of Buck before the Planetary Council building on Masa Four. The Masians think it quite natural. They like dogs enormously, and dogs like them, too. The Masians already have a proverb that a dog is a Masian's best friend. There's no statue of Buck on Earth, though. But he doesn't mind. Buck is a very happy dog.

He's with Holden. He follows him everywhere.

THE END.

BRASS TACKS

Honest, guys, Kuttner isn't wearing all the false whiskers—and that December editorial did bring in some new authors. E. E. Smith says I'll be seeing his new serial soon—may start about November. The loss of pages was an unexpected blow; the paper situation is bad. We ran out of that rotogravure paper, couldn't get more, and had to change our original plans.

Dear Mr. Campbell:

I suppose this letter is useless—you seem to have eliminated the Analytical Lab—but I'll write it anyway, since I have a few things to say before I am finished. First, the stories.

1. "Child's Play." Who wrote it? Could it be another name for Kuttner, perish the thought? You never can tell, you know. The guy is everybody in stf. A plus for the yarn, which may be among the top five of the year if you put out no more classics before December.

2. "The Equalizer," which would have rated first, needless to say, in many an issue. I hope Williamson is back to stay—he is good. A.

3. "Little Lost Robot," by I. Asimov. Couldn't he be writing Foundation stories in the time it takes to turn out the US Robot stories? He couldn't? Well, I just wanted to know—this series is fast approaching the record set by Professor Jameson, Captain Future, and some others. It may have already surpassed them. Ye gods—it's been going on for the last ten years!

4. "Tomorrow's Children." This is one that I don't think Kuttner wrote. These two guys may be real, for all I know. Give their first effort a B plus, on its merits as a first effort. Here's hoping they stay and improve; they ought to go somewhere.

5. "Turning Point." Rehash, like the one above. The only thing that saved them was being well-written. I am getting darned sick and tired of end of the world stories, atom war and otherwise. Just because you are a nuclear physicist, and are naturally interested in atom bomb stuff, doesn't mean that you have to

keep on foisting us the stuff. Not only you, but your competitors. Yeah. It gets monotonous and even sickening at times. Let up a little, willya? How about some galactic yarns? G. O. Smith can do 'em, if E. E. can't. By the way, tell E. E. to hurry and finish the last Lensman. We are breathlessly waiting for it. Yeah. Tell him also not to make it an atom-war story.

Rogers' cover was wonderful. It is fully up to the standard set by him in prewar days. I hope that you continue to use Timmins off and on occasionally. Incidentally, is Schneeman ever coming back?

Foundation stories.

Unknown Worlds.

And another thing. When warning us about the new paper, you said: "The pages will be the same." That is a direct quote, sir. The first issue you didn't lie. You kept the slick section, and 178 pages. Now what do you do? Pretend that you are editing a S&S pulp, and cut us down to 162 pages, eliminating the slick section. And still, of course, charging the same price. Naturally. That couldn't be changed. If you raised it, nobody would buy the magazine. If you cut it—well, that's just out of the question. No hard feelings, but you might not try to pretend in your editorials. We can stand bad news, straight, without pretensions.

Bring back the Analytical Laboratory.

Don't drop In Times To Come.

Let's have more STURGEON.

—Don Wilson, 495 N. Third Street, Banning, California.

Beginning of an "Answer"?

Dear John:

Hal Clements' "Answer," in the April issue, is closer to reality than you'd think from reading the story. You're aware of the theoretical work, now going on in several parts of the world, in representing reaction patterns of the human nervous system and other complex systems by means of equivalent "networks." Professor Norbert Wiener of MIT —who is, incidentally, one of the leaders in this theoretical development—tells the following story, showing how remarkably far we've gone on the practical side.

It happened at Chicago this March. One of the University of Chicago boys had completed a gadget, not too credible a gadget at that, for the use of the blind. It could scan a page of type and read it aloud! You may have read about it. Well, its inventor was expounding its operation to a group of his colleagues when one of them, an anatomist at Illinois, was given to think. "Isn't that last diagram," he asked, "a diagram of the fourth subretinal layer?"

Investigation showed that indeed some of the "coding" operations of the machine paralleled the coding operations of the human eye. We're well on our way to Clements' "answer!" However, since our knowledge of the brain's working, for that matter our knowledge of anything, can hardly be expected ever to be complete, I doubt that we'll ever be driven either to assuming a mystical

spirit or to the dilemma which confronted Dr. Wren.—Chan Davis.

As usual—with a well-liked issue, ratings varied enormously.

Dear Mr. Campbell:

My rating of the April issue follows. As I wrote you once before, you seem to hit alternately excellent and only so-so issues. This one is super. As a result, rating it was difficult. If it were possible, I'd put them all in first place. Here's how I finally wound up, though:

1st: "Psych's War" (Hopkinson, Jr.)—not only possible, but highly probable in the future. Also, a grand job of writing.

2nd: "Project" (Padgett)—this is near-perfection.

3rd: "Answer" (Clement)—some highly interesting technical data in this one—hence the third spot.

4th: "An Enemy of Knowledge" (Phillips)—a haunting piece, and a needed warning. By no means a new idea, but Phillips knows people better than some who have tried the theme. I'd say he comes close to actuality.

5th: "Time and Time Again" (Piper)—I loved this one, and would have rated it higher, only it seemed to fall off a bit toward the end. It seems illogical that if one could come back and effect an alternate destiny that the entire sequence of events would be so altered that the "memory" would be inaccurate, and useless. For instance, a $5000 bet on Assault would likely have changed the odds, so that the original eight-to-one odds would be lowered. And so on. That's only a minor sample.

6th: "Home of the Gods" (van Vogt, AE *or* EA) somebody had to be last, and this time it's one of my favorite writers. Reason: this is the second Lord Clane tale I've encountered, and it seems that these would be far better if serialized, rather than thrust forth one at a time, where one must struggle with memory—as I have to!—to recall the former situations these characters got into, and which events DO color this tale, independent though it may be. Or is this YOUR fault? I'm not panning Van Vogt, mind you. It's just that this tale didn't quite ring the bell as some of his have.

Incidentally, I'd stick your "New Art" item in there about third place, too, if possible, because you handed me a piece of information I "never knew till now"—about the metal plane. Kids nowadays use telephone, radio, and automobile with the same nonchalance as they do a knife and fork, and know nothing whatever of the sweat that went into the creation of those commonplace items. I'm glad you dug that up the way you did—Philip H. Scheller, Upper King St., R.F.D. No. 4, Greenwich, Connecticut.

Hiroshima—4 square miles; Siberian meteor—400!

Dear Mr. Campbell:

The April ASF maintains the

traditionally high standards of the magazine. In addition the new format is a decided improvement.

I would rate the stories as follows:

1. "Home of the Gods"—Van Vogt
2. "Time and Time Again"—Piper
3. "Project"—Padgett
4. "Answer"—Clement
5. "Psych's War"—Hopkinson
6. "An Enemy of Knowledge"—Phillips

Although I have rated it low, I am especially interested in "Psych's War." The reason for its low rating is that the author has underestimated the possibilities of the technique. It would be more efficient, if less dramatic, to include a few special situations where the hypnosis would be removed. Or even permit the subject to have conscious control—autohypnosis, as it were.

Which reminds me; it's rather strange how that Russian official up in Canada gave so much information so easily.

In the hands of a less capable author, I should expect the Lord Clane to turn out to be a normal man of present-day type, with everyone else, of course, being mutants.

A theme I do not remember seeing used very much is the mining of the asteroids, not for rare metals, but for iron, nickel, chrome, et cetera. It shouldn't take too much energy to nudge a small hunk of metal from its orbit a few million miles and cause it to intersect that of Earth. Profitable and dangerous. As a potential weapon, a few thousand tons of iron traveling at ten mps would compare quite favorably (?) with the A-bomb.—Warren Rayle, 663 E. 107th Street, Cleveland 8, Ohio.

There are just so many available pages to be filled in the magazine; stories and articles we don't like to cut or pad. The only elastic feature of the magazine is Brass Tacks—and sometimes it gets squeezed out.

Dear Mr. Campbell:

There's another magazine in the field which claims that science has caught up with the old type science-fiction, and that it is now publishing a new type. This new type, after some study, appears to be practically the same as the old type, only not quite as good. Astounding, however, for the last two years or so, without fanfare or fuss, has been quietly going ahead and publishing a type of science-fiction that really *is* new, and that makes most of the old type seem weak by comparison. In fact, all but one department of the magazine have been steadily getting better and better all the time. The stories are beautifully and carefully done, with really thought-provoking ideas and characters that will stick in the memory of fans for a long time to come. The illustrations are, almost without exception, unusually well set up. Bernbach's illustrations in the April issue are very fine, keep him on. The covers get better and better all the

time. The articles are really timely, informative, and generally far ahead of the Sunday-supplement stuff that passes for "real science" in most magazines. In fact, the whole magazine is really something that science-fiction can be proud of, something that you can show to the scoffers and say, "Since when is science-fiction tripe!" The recent atom-bomb stories are wonderful, frightening things, really not "astounding" at all, since they very likely could happen in another war; "Tomorrow's Children" and "An Enemy of Knowledge" are the best, although they're all good.

BUT, Brass Tacks is the worst letter column published. It's too short and doesn't have half enough editorial comment on individual letters. Either you leave out Brass Tacks entirely, or you publish three or four long, highly technical letters from people who write in and dispute the accuracy of the meteorology, astronomical mathematics, electronics, or gunnery trajectory computation of the articles. Not always, of course, but more and more Brass Tacks is inclining toward the old Science Discussions. There's nothing wrong with Science Discussions, but it gives fans like me, who are majoring in history and English literature, a rather futile, behind-the-times feeling, as if our humble opinion is not wanted, aside from maybe a card rating the stories. I'm not asking you to print this, just to print letters from more of the ordinary, nontechnical fans, whose discussions may be limited to general science. Of course, if I'm the

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only such fan writing, sometimes I feel that I am—it makes no never mind. Another thing that would be very much welcomed would be the publication of more letters, technical or otherwise. You could maybe print the best paragraph or two of nine or ten letters, instead of three or four in entirety. And please give us more editorial comment on the letters, not one sentence or none, but a real addition to the discussion. It adds a lot to the column, gives it more of a feeling of discussion. Brass Tacks has gotten a lot worse than it used to be. Shorten the article a bit, leave out the Lab, but give us more letters!

Of the stories in the April issue, I rate "An Enemy of Knowledge" first—if mankind doesn't realize the danger of another war, it won't be the fault of Astounding. Second comes "Home of the Gods." I hope this series continues, I'm just as interested as Clane in finding out about the civilization that preceded this. If it was so wonderful that the civilization after it is degenerate even with spaceships and what no, it really must have been something! The others are a little hard to rate, they're almost uniformly good. Put "Answer" third, "Psych's War" fourth, "Time and Time Again" fifth, and "Project" sixth. "Project" just doesn't hit the spot, somehow, it isn't up to Padgett's usual standard. The idea of Homo superior developing from atom bomb rays seems to be a little farfetched anyhow, and besides, is Homo sapiens so *much* ahead of Neanderthal man? He's cleverer, all right, in using his hands, and discovering facts and using them—but physically and emotionally, he isn't really too much different. It seems to us, looking back, that the different species of man came quickly, very different from those preceding, but I'll bet that as a general thing the fact that some one person was superior wasn't even realized by the others. I think Homo superior will come as a natural mutation, not helped by the atom bomb at all, with possibly a little more emotional stability, and physical adaptations more suited to walking upright, and so on, but I doubt if he'll make Homo sapiens seem like awed children. Nature changes things slowly, not with dramatic suddenness. And in the light of the recent reports from Japan, it seems much more likely that the effect of the atom bomb on the human race will be the kind that is described in "Tomorrow's Children." As a matter of fact, a sequel to "Tomorrow's Children" would be very interesting. Go fifty years ahead of the time of TC, and give us a picture of a race of mutants. It might be a little shocking, but very interesting to speculate on.

So here I end up with the same type of long, long letter that I railed against. But how about it, see if you can't improve on Brass Tacks. You might conduct a poll, and if I'm in the minority I'll bow out gracefully. Aside from Brass Tacks, all your departments and everything are head and shoulders above the rest of the field.—Margaret McIntyre, Box 192, Isanti, Minnesota.

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